Antiquity

A Quarterly Review of Archæology

Edited by

O. G. S. Crawford, F.S.A., and Roland Austin, F.S.A.

JUNE 1935

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EDITORIAL NOTICES

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THE SO-CALLED SHEIKH-EL-BELED
Cairo Museum
(*See* ANTIQUITY, March 1935, p. 14)

facing p. 129

Antiquity

A Quarterly Review of Archaeology

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Editorial Notes

OUR Editorial Notes are usually addressed to all who may read them; but for once a more limited audience is visualized, though we hope that all will read and be interested. We are writing mainly for the contributor this time. There are several ways in which those who write articles for publication in ANTIQUITY, or for any other illustrated journal, can assist the Editors. It is, for instance, the business of every writer, and particularly of those who do research work, to get to know the processes involved in publication; how maps should be drawn for reduction, and how photographic prints should be made, and so forth.

It is necessary to acquire this knowledge because the work of research is not complete until it has been published. Without it no archaeologist, therefore, is properly equipped. This is not the place to give a course of instruction in how to submit articles (or books) for publication, but the subject might with advantage be added to the syllabus of courses in archaeology. It is, for instance, no part of the editorial duty either to find, or to make illustrations, though, because

he wants the article, the Editor often does both. Maps, too, should be drawn with due regard to the size of a page in the journal for which they are intended, and for the amount of the reduction they will have to stand. Articles should begin at the beginning of the subject treated and not in the middle, and should end at the end. They should also be written in plain, straightforward English, with as little technical jargon as possible.

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We hasten to add that these defects appear only in the articles rejected, and further that most of the work thrust, as we think, unfairly upon Editors is the result of lack of knowledge and not from mere laziness (though that may sometimes contribute !). We are often complimented upon our illustrations, but the secret of them is quite open—to get good negatives and make *good, enlarged* prints from them. This could be done, and should be done, by the contributor in the first instance, when he is submitting the article ; actually it very rarely is. In most cases it is necessary to write for the negative, sometimes (as we had recently) to the Antipodes, only to discover that the negative is lost and nothing but a poor little contact-print is available.

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Up to now we have usually done the work and said nothing, but in future we may become more hard-hearted, and return articles that would entail the extra work we have referred to above—we think it would be quite reasonable to do so and thus conform to the usual practice.

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The excavating season will soon begin in grim earnest. Many important sites are to be tackled, some for the first time. Maiden Castle will no doubt be the centre of attraction, as it deserves to be. An article by Dr R. E. M. Wheeler has discussed in *The Times* of 1 March last the results obtained from the first season's work. Of the smaller digs we shall watch the excavation of the Norwich Woodhenge with great interest. Ireland is well to the fore as last year, and Dr

Hencken's expedition will no doubt continue their pioneer work. Dr Hencken has chosen for himself a big task, but he has big ideas and is going to make archaeological history on a large scale.

In a letter to *The Times* (13 February) Mr Harold Peake, F.S.A., asks the Conservator of the Museum of the Royal College of Surgeons for the evidence upon which he attributes the Ovingdean skull to the Bronze Age (Mr Peake says ' the late Bronze Age '). It is true that, as Mr Peake points out, the inhabitants of England at that date usually cremated the bodies of their dead ; so that naturally we have no evidence of their head-form. But even if we had it would be impossible for an anatomist to say ' this is a Bronze Age skull '. (See also MAN, 1935, nos. 55 and 56).

It is impossible for an anatomist, acting as such, to assign a skull to any given period, that is to say, to date it ; to do that is the business of the archaeologist, and he does so from associated grave-goods, when present, or from the type of grave it was found in. *Ex cathedra* pronouncements of this kind are unscientific and misleading. The bases of physical anthropology, and the racial inferences built upon them, need re-examination. The future lies with such devices as the coefficient of racial similarity, so far as physical anthropology has a future. Personally we think too much attention has been focussed on race and racial differences. The results are apt to stimulate just those passions that lead logically to war and should rather therefore be damped down.

How revolutionary the new method can be is shown by some of the results already obtained. Like most of his generation the present writer was brought up to believe that the neolithic inhabitants of Britain were ' small dark Mediterraneans '. He ventured to question the correctness of this theory some twenty years ago, and was supported by one who is now an eminent anthropologist. It appears that he was

right, and that the neolithic long-barrow skeletons have the closest affinity with the inhabitants of the North German plain. In other words, our neolithic ancestors belonged to the Nordic long-heads, not to the Mediterranean long-heads. In modern terms this means that they were more akin to Norwegians than to Sicilians. (For references see ANTIQUITY, 1934, VIII, 106).

The promised article on 'Arthur's Battles' has again been unavoidably held over but we hope to publish it definitely in our September number. It will be followed by one on Western Seaways, dealing with intercourse between the Celtic west and the Continent during prehistoric times and the Dark Ages.

The Evolution of the Domestic Horse*

by Dr Max Hilzheimer

THE term ' horse ', usually taken by the lay mind to apply only to the domesticated animal, has a much wider connotation for the zoologist, who extends it also to include the zebra, the grey African ass, and the Asiatic dziggetai which varies in colour from yellow to reddish brown. The latter derives its name (*hemionus*) from its appearance, which is something between that of the ass proper and of the horse proper, although actually it is not closely related to either group, and in fact is better regarded as quite independent.

Until very recently, only the ass and the horse proper were known to have been used for domestic purposes, but the latest excavations in Mesopotamia have led to the astonishing discovery that the early Sumerians, about 3000 B.C., tamed the local breed of Asiatic dziggetai, *i.e.*, the onager of hither Asia. However, this breed seems to have been confined to that period and to have become extinct with the destruction of the old Sumerian kingdom, for we find no trace of it among the later Sumerians. Woolley's discovery of pictures of animals resembling horses drawing war-chariots[1], in the royal graves of the early Sumerian kings at Ur, naturally took the scientific world by surprise as being something entirely novel. Before this, there was no evidence that the Mesopotamian dziggetai was ever domesticated, so that the find caused much discussion as to the precise nature of these animals. A few scholars took them to be horses, but the majority, including the writer, preferred to regard them as mules, while Woolley himself at once named the dziggetai. His opinion, however, was thought improbable by zoologists, not only in view of the small size of the onager (just over 10 hands), but also because the taming of these creatures was held to be quite impracticable, all modern attempts to tame them being reported as failures. But I have lately received from an American source certain collections of bones, not indeed from Ur, but from Tell Asmar, among which are very many remains of the onager but none of other animals resembling the horse : this, therefore, confirms Woolley's theory that the onager was used as a draught-animal by the early Sumerians. The

* Translated by Roland G. Austin, Glasgow University.

[1] See Woolley, *The Royal Cemetery*, pp. 271 ff, and plate 92.

zoologists' mistake can be easily explained ; the mule, produced by crossing the ass proper with the horse, so closely resembles the dziggetai (itself midway between the two parent types) that the two can hardly be distinguished from each other in primitive art, where exact details of breed are seldom stressed. However, in his main work on Ur,[2] Woolley has recently given us a fine picture of such an animal from an early Sumerian rein-ring ; this clearly shows all the points of the dziggetai—short ears, erect mane, and stalk-like tufted tail (*gestielter Quastenschwanz*) like that of an ass (PLATE I). We must therefore regard the domestication of the onager as peculiar to the early Sumerians, not recurring elsewhere. This is suggested also by the unique method of bridling, with no bit, but instead a strap curving round the jaw. It is difficult to decide whether this innovation was due to external influences.

About this time the ass had already been domesticated in Egypt and the horse in Europe. We do not know when this took place in Egypt, but the ass appears along with others as a definite domestic type on a slate palette of an early period ; it is uncertain whether, still earlier, prehistoric, examples represent the domestic or the wild ass. At a later period, asses occur with remarkable frequency in Egyptian art ; they were used chiefly as beasts of burden, and perhaps also for treading corn, while occasionally they appear bearing a frame (*Gestell*) for carrying a woman. The ancient Egyptians did not use the ass for riding or as a draught-animal ; in fact, in early times we know of only two peoples who were accustomed to ride on asses —the Jewish patriarchs, if indeed we do not misunderstand the Biblical tradition, and the Nubians. In the case of the latter, this practice may be inferred from some 6th century bas-reliefs, now in the Berlin Museum, but it must certainly have been suggested by the analogous use of the horse, which had already been known in Egypt for a thousand years. We do not know when the ass began to be bred outside its native Egypt, but this seems to have occurred very early—at the beginning of the third millennium. However widely distributed these animals were, the peoples of the ancient East (with the two exceptions already mentioned) never used them for any other purpose than as beasts of burden, and they were not bridled but always driven. This distinction between the ass and the horse cannot be too strongly emphasized, for it is a clear proof that both animals were employed for domestic purposes independently and with differing ends in view. We do not know whether in those

[2] *Loc. cit.* p. 78, and plate 166.

days there were already varieties of breed, such as the fine-bred white asses of Muscat, or the enormous beasts of Poitou, Catalonia, etc., or the pigmy Cingalese breed. Early Egyptian art shows only one type, and probably the development of breeds did not set in until a later period. The domestic ass is pre-eminently at home in warmer countries, as one might expect from its African origin; it is comparatively rare in colder lands, and even the climate of central Europe does not seem to suit it.

The domestic horse presents quite another problem. Although this animal avoids the tropics proper, it is otherwise widely distributed throughout the whole world. But the old world is its real home; it was there that the wild horse flourished during the glacial epoch, even passing thence into North America. We have many remains of bones from this period, as well as many representations, apparently very true to life, from palaeolithic cultural sites in western Europe. It is possible that one may distinguish two and perhaps three different types. But it is untrue to assert, as was once done, that these horses of the glacial period were ever domesticated. Domestication only begins in the present geological epoch, and the existence of the domestic horse in Europe cannot be definitely proved until towards the end of the later Stone Age, in many instances not until the Bronze Age. As for Asia, there has hitherto been no investigation into the prehistory of the home of the wild horse there. It appears that, at the period when domestication began in Europe and Asia, wild horses only existed north of the great mountain chains, with the exception of the extreme West, where they seem to have crossed the Pyrenees and to have reached Spain. The habitat of the wild horse appears to have stretched eastwards from the sea-coast right across mid-Europe and central Asia as far as Mongolia, where the last living wild horses are found today. Northwards, it reached as far as central Sweden and Siberia. It is in this enormous region, therefore, that we must look for the home of the domestic horse.

Here we have to deal, as it seems, with two types, the so-called Przewalski's horse[3] and the Tarpan[4] (PLATE II). Their respective habitats are divided by the 40th degree of longitude.[5] The Tarpan lived to the west of this line, and until last century was still to be found in the Steppes of south Russia. It is described as a small mouse-grey

[3] *Equus equiferus Pallas.* [4] *Equus gmelini Antonius.*

[5] Roughly the longitude of Archangel and Rostov-on-Don.

horse with black eel-mark, black or slightly striped legs, heavy head with a concave profile, soft erect mane, and a tail quite covered with hair. A somewhat divergent type, the so-called Forest Tarpan, existed in the forests of western Europe, as Vetulani among others has lately shown. It is not known how far the Tarpan spread westwards, or whether other breeds originated the types described to us in a tradition which reaches to the Middle Ages. Professor J. C. Ewart assumes another breed for western Europe, which he terms *equus Celticus*, basing his theory on the definitely divergent types of pony in north Britain and in Norway. In any case these wild horses of western Europe appear to have been more markedly striped, for occasionally even today some of the Norwegian domestic horses, evidently their descendants, can be found striped exactly like a zebra.

East of the 40th degree, over the whole tract of the Steppes of Europe and central Asia, lived Przewalski's horse (PLATE III). This breed is for the most part extinct in its original habitat, and survives only in the extreme east, in Mongolia, though rarely found. It is some 13 hands at the withers; it is of a brown colour, eel-marked, bearing traces of a cross on the shoulder, with stiff erect mane, short hair on the upper part of the dock, heavy long-muzzled head with straight to convex profile. It is not certain whether wild horses exist today still further east of those regions, but mysterious tales recur of white ones being seen in the neighbourhood of the Jana. But such animals certainly have no bearing upon our inquiry into the origin of the domestic horse, which could only have been evolved from the Siberian breeds already mentioned and now probably extinct—if indeed these differed from Przewalski's horse, and after all we only possess fragmentary remains of them. What then is to be the starting-point in our inquiry? Must we consider several centres of domestication? How did the domestic horse spread from them? To answer these problems we must attempt a brief sketch of the classification of the domestic horse.

According to an early method of classification, the domestic horse is divided into oriental and occidental breeds. These two contrasting types may be roughly compared by taking the modern Arab (PLATE III) and a heavy horse such as the Clydesdale (PLATE IV) or the Rhenish-Belgian. But certain European breeds also belong to the oriental class, among others the Konink (PLATE V), a breed native to Poland which has lately been the subject of investigation by Polish scholars. It is a very ancient breed, and was indigenous to Europe in prehistoric times. This is an excellent proof that the so-called

oriental group did not originate in the East; and certainly not in Arabia, since horses were not found there until about the time of the birth of Christ, and the fame of the Arab breeds coincides with the spread of Islam. The original home of the oriental horse is to be sought rather in Europe, as most investigators now assume, particularly in the Steppes to the north of the Black Sea, where the now extinct Tarpan had the same skull-formation, *i.e.*, relatively broad brow, great round eye-sockets, slightly concave profile, and a face that was short in proportion to the skull. From this region these horses spread eastwards and southwards, and gave rise there to a number of fine breeds, which owe their excellence partly to the extraordinary skill in breeding possessed by the oriental races and partly to the extremely favourable climate. Although these highly-bred oriental types are quite unlike the low breeds still native to eastern Europe today, such as the small Lithuanian pony or the Polish Konink and other kindred species, yet they are derived ultimately from the same stock, and show the difference produced by a favourable climate and skill in breeding on the one hand and by a bad climate and indifference on the other. The earliest of these breeds may be seen on Assyrian monuments dating to the first half of the first millennium, represented in a most life-like manner. Actually, horses were introduced into Assyria considerably before this; our earliest evidence for them, though scanty, goes back to the third millennium; but they began to be more numerous from the middle of the second millennium onwards, and to assume importance as animals which could be used in war either by the Assyrian cavalry or to draw the light war-chariots. Horses appear to have reached Mesopotamia from the north, probably together with the Aryan tribes, which spread as far as Egypt in their wanderings (*i.e.* the Hyksos) and imported the horse thither about 1800 B.C.—it was quite unknown in the early and middle kingdoms. The early Assyrian horse (PLATE VI) was a big, sturdily-built, noble animal, comparable perhaps to the modern Hanoverian. The early Egyptian horse (PLATE VII) was a smaller and lighter breed, probably one of the chief ancestors of the modern Arab. It seems to have reached Egypt not from Mesopotamia, but rather from races living further to the west. At any rate it resembles more the horses of the Hittites, which, though drawn in a crude and clumsy style, yet afford evidence of a small light type, shown invariably with a characteristically high carriage of the tail (PLATE VIII). The horse of the early Egyptians also presents this very same characteristic (*Abspreizung des Schwanzes*), as do many Arabs of today, a fact which establishes,

with much probability, the relationship of all these breeds. In quite early times there was another oriental type, which betrays unmistakable features of the occidental horse, to which we shall return later. The other breeds of classical antiquity very likely go back to the Tarpan. Such a type is found in Greek works of art, especially in the life-like representations of the Parthenon frieze ; these are small stocky ponies with a somewhat thick-set neck, but otherwise highly-bred. The early Roman cavalry-horse also appears to belong to this group, as it is shown for example in the only extant equestrian statue of Marcus Aurelius, or on the pillar of Trajan, and in countless other representations. Greco-Scythian art proves that fine highly-bred beasts were to be found in the home of the Tarpan. If for example we look at the ' horse-taming ' Scythians on the so-called silver vase of Certomlyk (PLATE IX), it is not unlikely that here we have depicted the actual capture of wild horses, indeed the wild Tarpan itself. In fact it is from this splendid, natural picture that we gain probably our best impression of the extinct wild horse of south Russia. It remains to hope that the numerous skeletons of horses found in the Kurgans of south Russia will some day be examined and correlated by an expert.

Let us now turn to the occidental group. The name is derived from the fact that their origin was assumed to be in the west. The type is said to go directly back to a heavy wild horse, whose bones are found in the glacial deposits of central Europe. But it is remarkable that such a heavy horse has never occurred in prehistoric sites. Neither are there any representations of such a horse extant from prehistoric Europe ; much less are we told by classical writers of any breeds of horses which are obviously of the heavy draught-horse type (*Kaltblütig*). One of the earliest representations of a horse showing the points of the occidental group occurs in the tombstone of Albanus, an Ubian, at Châlon-sur-Saône, dating to the 2nd century A.D. This has all the characteristics of the heavy draught-horse : here are the arched croup (with the tail so to speak inserted into it), the relatively small head as compared with the size of the animal, the flat hoofs with the fetlocks above, the curly hair of the mane (only found in such horses), the poise of the neck, the mould of the head, the heavy figure with powerful chest, the peculiar action of the forelegs : in all these points it resembles the heavy cavalry-horse of the later Middle Ages. The heavy draught-horse is first clearly to be found in Europe in the region round about the North Sea coasts (in the wide sense of that term). About two hundred years later, a characteristic picture of it can be seen on a helmet-fitting

from the tombs at Vendel. This sudden appearance of the draught-horse in north-central Europe has led me to think that we are here concerned not with a type which traces its descent directly from a wild horse of like appearance, but with one which was produced as an exotic by skilful breeding from the common type, on specially favourable soil. My view is supported by the dual appearance of this type in places geographically separate—once in the northeastern Alpine regions (the so-called Noric horse), and then again, but much more widely spread, in the East, in ancient Persepolis. Here we find, from about the fifth or sixth century B.C., a small pony-like horse, exhibiting clearly all the marks of the heavy draught-horse type as I have described them above ; the breed lasted till the period of the Sassanids. Although for some years I have laid increasing emphasis on the importance of this peculiar breed, investigators into the history of domestic animals have paid practically no attention to it ; presumably because this characteristically draught-horse type, appearing suddenly here, did not fit in with the theory by which the occidental horse was derived from a heavy wild horse native to Europe. Actually such a breed seems to have existed there once, but only during the glacial period, and apparently did not outlive that epoch anywhere. Thus it became extinct several thousand years before the horse was domesticated, so that this break in continuity alone suffices to rule out the theory that the heavy draught-horse type is descended from the wild horses of glacial times. If in spite of this there is a certain similarity between them, it can be explained in either case by my theory of an exotic breed produced in specially favourable circumstances. The types would naturally resemble each other, and in fact are an example of what zoologists term convergence.

In this way it appears that at least the European horse, including the so-called oriental horse of western Asia and the breed of northern Africa, is to be derived from the European Tarpan in its various subdivisions. The Barb is perhaps an exception ; our information about its history is at present very inadequate.

At the moment there is no conclusive explanation available as to whether we must assume the existence of a separate centre of domestication and a different primitive type in the case of the horse of central and eastern Asia.

Waggons and their Ancestors

by R. H. Lane

THE main purpose of this article is to put on record material from two collections of photographs, made by Mr O. G. S. Crawford and by the writer. As the ' exhibits ' were varied and numerous, it seemed desirable to make a selection that would link up with what has already been published on the subject in Antiquity, producing in the process some shadow of an evolution. For any opinions that are advanced, however, the writer, and not Mr Crawford, must be held entirely responsible.

Few references will be made to places outside Europe (or rather certain parts of it) or to times earlier than the 11th century. But as Sir Cyril Fox points out, the most primitive types are still to be found in the same districts as the highly developed ones, and there can be few types of vehicle for transporting goods by land that have not been in use within these limits.

The development of such transport (for with passenger vehicles this article is not concerned) is governed by four main factors—the load to be carried ; the road or track by which it travels ; the skill of the maker ; and the capital available in the industry which it serves. In England, at any rate, legislators have often intervened, and their actions have sometimes modified a type in a way which has survived the legislation.

The vehicles that will result when these four factors are at a minimum were described by Sir Cyril Fox in part of his article, ' Sleds, Carts, and Waggons ',[1] and I hope that he will accept my frequent reference to this as a sign of my appreciation. He shows us two types of wheel-less transport—the sled, developing into the wheel-car, and the ' v ', made by tying two poles together at one end, supplying the possible ancestor of the truckle-cart.

There is, rather remarkably, evidence that vehicles of this most primitive stage survived very late, even in London. A cartoon designed

[1] Antiquity, June 1931.

to ridicule the Excise Bill of 1733 shows what is virtually a sled, provided with very small solid wheels, which just raise it clear of the ground. The load is a barrel, and it is drawn by a lion and a unicorn. The cartoonist was presumably drawing something which was familiar in his day, though doubtless with a less remarkable team! In the 19th century an engraving from a volume[2] published in 1829 shows a sled, again loaded with a barrel, being drawn by a horse past the King's Weigh-House. The runners are curved, probably to reduce friction.

PLATE I, a photograph taken by Mr Crawford in Ireland, shows a vehicle which is definitely a cart, and not a glorified sled. It no longer suggests, as do some of the earlier type, that the maker kept his 'machine' as sled-like and as low as he could, just in case these new-fangled wheels 'let him down'. So it represents a second evolutionary stage. Much like this must have been the carts which Professor Thorold Rogers[3] says were common in England in the 13th and 14th centuries. The price of such a cart was, he says, under 3 shillings, complete with wheels, in the late 13th century, a time when this sum was less than half the value of a quarter of wheat. The wheels are described as plain or naked, which he interprets as solid and not bound with iron. Even so, the wheels cost as much as the rest of the cart, which must therefore have been, like the Irish cart, of very simple construction. He suggests that the plain wheels were mere sections of tree-trunk, but this I venture to doubt.

In any case, PLATE I is far from representing the crudest form of its type, for inspection shows an iron axle, iron tyres, nuts and bolts, as well as segmented wheels. It looks like (and doubtless is) a modern wheelwright's version of a traditional type, whose origins go back 'time out of mind', and the waggon-hub in the background shows that it by no means embodies the whole skill of its day. In this too, the scene has a medieval flavour, for in the 13th century solid and spoked wheels existed side by side.

The photograph shows the defects of this kind of wheel. It is easily damaged, and the bearing surface is small. Here it has been increased by an iron plate; in plate XVI illustrating Sir Cyril Fox's article it has apparently been increased by wooden blocks. Solid wheels will carry bigger carts than this, and they can be improved in several ways, such as cross-bars to strengthen them, and holes to

[2] *London and its environs in the Nineteenth Century*, plate 83.

[3] *History of Agriculture and Prices.*

lighten them.[4] But if loads go on increasing, and capital too, the necessary skill will develop, and spoked wheels will come into being, though the solid may continue to be used, as they have here.

PLATE II shows this fresh stage in evolution. The cart has spoked wheels, on wooden axles, and its body, though still very crude, has some provision for a piled-up load. Its main interest is the striking way in which it reminds us of the ' v '. Divested of its wheels and rudimentary sides, it is just two timbers fastened together at one end, and kept apart at the other. Probably the natural strength of the triangle so formed gives it a high survival value. Its narrow fore-end moreover, is very suitable for ox-traction, but less so for horses. The latter can, of course, be harnessed with a pole and traces, as they are still in Yorkshire waggons, but shafts seem to be normal, and they produce a rectangular cart.

This photograph was taken by Mr Crawford in Tiflis recently, but similar carts were once in use in England. Two are shown in the 11th century Cotton MS. One (PLATE III), used for carting logs, is very similar to PLATE II. Its sides are of wooden uprights, higher than the modern example, with a cross-bar at the top. To carry the ox-yoke it has at the fore-end a fitting which looks like a pair of sugar-tongs with a pin through the middle, exactly like the device shown in PLATE IV, from Sukhum. The 11th century artist's perspective leaves something to be desired, but he can hardly be depicting anything but a triangular cart, like that of PLATE II. The second cart of the Cotton MS. is exactly similar, except that its sides are of wattle, a device which is as old as Homer, and also survives in another of Mr Crawford's photographs, from Transylvania.

In both these Cotton MS. carts, the wheels are built up with eight spokes and eight felloes. Such must have been the spoked wheels mentioned by Professor Rogers. He describes them as bound with iron in the form of separate pieces or ' strakes ' first appearing in his lists in 1280 when they are a standard fitting, doubtless of long standing, but expensive, costing eight or nine shillings. It is not easy to make out anything of the kind in the Cotton MS. pictures, and there are curious dots which suggest a possible reason for their absence. There is much that might be said on the development of the ironwork on cart-wheels, but it would occupy too much space here. But it is well to notice that artists are not always trustworthy in minor details, outside

[4] See ANTIQUITY, March 1928, 18 ff, and September 1929, p. 340.

matters of which they themselves have knowledge. I have seen a modern highly-skilled draughtsman go wrong over the details of a waggon, of which he was making a separate drawing, and to many landscape artists a cart is just a detail in the middle distance.

The 14th century Louterell Psalter also shows a cart used for harvesting. The wheels, as well as can be judged from the human figures, are larger than in the Cotton MS. They are studded with large-headed nails, and have small (? iron) plates over the felloe joints. These are probably the ' gropes ' of medieval accounts. Spokes and felloes are six in number. The cart is drawn by three horses in line, has shafts, and is parallel-sided, not ' v ' shaped. Its chief interest lies in the fact that it has developed a projecting gallery in front, to increase the loading area. This survives in many present-day English carts, and is often so large as to hide most of the horse in the shafts. It is a permanent part of the cart, and not detachable.

As these wheels have fewer spokes than those of the Cotton MS., it is rather a surprise to find in Chaucer the statement, ' Twelf spokes hath a cartwheel comunly ', for he is roughly contemporary with the Louterell Psalter. It suggests that the modern system of having two spokes to each felloe was then coming into use. Modern cart- and waggon-wheels nearly always have twelve or ten spokes, and the latter number is found in a cart represented on a 16th-century title-page,[5] with, again, a gallery in front ; we have now reached a vehicle differing very little from a common type of 19th-century cart. It is designed to carry a big load, and shows skilful planning and workmanship. Capital had increased as the Middle Ages receded, but the development of roads lagged far behind, and it was the bad road-surfaces which were, I believe, responsible for the use of very large wheels.

Whether they are a development of the cart, as seems inherently probable, or originated independently, as some have suggested, waggons are certainly of great antiquity. Pliny attributes their invention to the Phrygians, and Hippocrates, a Greek writer of the 5th-4th century B.C., speaks of the Scythians as living in waggons, of which the smallest have four wheels, and the largest six. Scythia was rather a vague region, for the Scythians were nomadic, but it seems to have reached as far west as the Carpathians. PLATE V shows a present-day waggon from Bucharest, and Mr Crawford points out that in Slav countries today the four-wheeled vehicle is distinctly the normal,

[5] Harman's *Caveat*, 1567.

rather than the two-wheeled. It seems then, that the four-wheeled tradition in southeast Europe may be of very ancient origin.

Nearer home, the 11th century Bayeux Tapestry shows a very elementary four-wheeled vehicle. It is rather diagrammatic, but appears to be flat, without sides. It clearly has wheels with eight spokes, and is hauled by men, an interesting point in view of Sir Themistocles Zammit's opinion[6] that the Maltese prehistoric carts were pulled by man-power.

In England, however, after the Norman Conquest, waggons were rare, according to Professor Rogers, though they are mentioned once or twice in his lists of prices. Their absence is understandable, for with medieval conditions of farming and trade, loads and capital were seldom great. Their adoption in England, at any rate, is therefore a later development.

There is evidence to show that both the waggon and its name were introduced into England from the Low Countries in the latter half of the 16th century. Stow tells us that 'in the yeere 1564, Guylliam Boonen, a dutchman, brought the use of coaches into England . . . and about that time began long wagons to come in use, such as now come to London'.[7] (Boonen was, apparently, Queen Elizabeth's coachman.) This statement is supported by a proclamation of 1618 ascribing the decay of highways and bridges to the common carriers, who now use four-wheeled waggons drawn by 8, 9, or 10 horses, and carrying 60 cwt. at a time, where heretofore they used two-wheeled carts, carrying 20 cwt. In 1622 waggons were forbidden altogether, but their use was allowed with restrictions in 1661, and one appears, drawn by the statutory maximum of five horses, in Loggan's *Oxonia Illustrata*, 1674.

So far, these are, no doubt, mainly stage-waggons, carrying merchandise to cope with the rapidly increasing commerce of the time, but this 16th century also saw the rise of the independent farmer, who, freed from the limitations of 'open field' or 'strip' farming, supplied the growing towns with food for his own profit. Such men would have the progressive spirit which marks the epoch, and it is not surprising that we find some evidence of the existence of farm waggons at any rate in the 17th century. Two appear[8] in a picture of harvesting

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[6] ANTIQUITY, March 1928.

[7] *Oxford English Dictionary*: article 'WAGGON'.

[8] Loggan, *Cantabrigia Illustrata*.

at this time. Probably they were rare, for Henry Best of Elmswell still sent his oats to market on packhorses in 1641. But the late 16th century, and still more the 17th, saw the beginning of those conditions of farming whose spread in the 18th necessitated the general use of waggons.

The skill to make them existed already, for, as Sturt points out, it is in making the wheels that the highest skill is needed ; and wheels, similar in essentials to the later ones, were already, as we have seen, being made in the 16th century.

It was not until the 18th century that ' enclosed ' farming became the normal method. Between 1727 and 1760, more than 200 private Enclosure Acts were passed, and the size of industrial towns also grew with increased speed. That is to say, the conditions requiring heavier loads became normal, and with them, the use of farm-waggons, for ordinary farming now justified the expenditure of greater capital, as well as providing it. In 1770 Arthur Young includes a waggon, priced at £25, among the desirable implements of a farmer with no more than 70 acres. Marshall at the end of the 18th century noticed that in Warwickshire the harness of the farmers' teams was often ridiculously ornamented, and their horses over-fed and under-worked to save their looks. Such farmers would be likely to take a pride in their waggons too. They could afford to pay for skilled labour, for good material, and for the beautifully shaped and shaved timbers, which were, as Sturt tells us, really an economy, as well as for a little beading and scalloping, which was, from the materialist's point of view, useless. It is rather difficult to share Marshall's indignation !

Somewhere in the 17th or 18th centuries the farm-waggon developed its characteristic surboards. The stage-waggons seem to have had none. This is natural, for the boxes and bales that they carried were usually heavy, rather than bulky. But corn, hay and straw, which formed a large part of the farmers' wares, were light in proportion to their bulk. Surboards, then, were added to farm-waggons, to provide the loading surface needed to carry the full load of some three tons. Further, corn, hay, and straw are apt to spread, so both sides and surboards needed support. Thus there arose the elaborate systems of struts and staffs, which are characteristic of the waggons in PLATES VI, VII, and VIII, as well as of those illustrating Sir Cyril Fox's article.

PLATE V shows another way of tackling the support problem. This ' outrigger ' device is in use today, over a large area of Europe, as Mr Crawford's photographs show.

Its purpose is clearly to help the axle, which looks rather slender, by applying some of the load to the *outer* end of it, as well as to support the body. Iron rods to both fore- and hind-axles apply some of the pull also to the *outer* end. Although the construction is rough, some skill must be needed, in designing the front outrigger, to allow the fore-wheels to pivot, when turning the waggon, as they are clearly meant to do. There are no surboards, but the narrowness of the waggon-body does not suggest that it is meant to carry the heaviest possible loads. Surboards seem to be peculiar to the British Isles. The devices shown in PLATE V are not limited to the area already mentioned, or to the present day. Iron rods taking the pull of the horses to the outer end of the fore-axle appear in a fairly recent photograph from Persia,[9] and it is also to be seen in pictures of English, Flemish, and Italian coaches of the 17th and 18th centuries. The support from the body to the hind-axle appears in a photograph of a Polish waggon in a recent number of the *National Geographic Magazine*.[10]

Little has been said up to now about the development of roads, and there is little to say, except that, at any rate up to the end of the 18th century, they remained as bad as they could be. From 1660 onwards there was incessant legislation on the subject, but it accomplished little. The statements of Defoe, Young, and others are well known, and Malcolm, a Surrey land surveyor, says that even in 1805 he had difficulty in riding six miles in four hours, and for a great part of the distance was in danger of being swamped.[11] The effect of this state of affairs on transport was twofold. It would help to popularize the use of waggons for heavy loads, because four wheels distribute the weight over more ground than two. It also made large wheels desirable, for they move better over rough or heavy surfaces. Malcolm gives 5 ft. 5 ins. as the normal diameter of hind-wheels throughout Surrey, and hind-wheels of similar size are to be seen on existing Wiltshire waggons of the early 19th century. Fore-wheels were smaller, to assist the turning of the waggon—always its weak point. That this was the result of necessity and not choice is clear from the writings of a 19th century coach builder. ' From what has been said about wheels, it is clear that the fore-wheels *should* be as high as the hind ones ; but as such a height would interfere with the turning of the coach . . . it is proposed that the fore-wheels

[9] Plunket, *Europe in the Middle Ages.*

[10] March 1935.

[11] *Agriculture of Surrey*, 1805.

should be of this height ' (viz. 46 inches ; the italics are mine). Malcolm gives the height of fore-wheels as 4 ft. 2 ins. The waggon-wheel was naturally bigger, but the principle was the same.

With the modern improvements in roads smaller wheels have come into use. By the latter part of the last century the average Wiltshire hind-wheel had shrunk to 4 ft. 10 ins. ; the boat-waggon, introduced there about 1900, has hind-wheels of some 4 ft. 2 ins., and the now popular trolley, wheels of about 3 ft. 6 ins. But until the English waggon had reached its ' zenith ', its designer could reckon on nothing but bad surfaces on the road.

Regional Waggon-types

Sir Cyril Fox has pointed out the need of determining the boundaries within which different types of waggon were or are in use. He says, ' the essential features of the " Glamorgan " waggons though not, I think, so finely developed, occur in Gloucestershire and western Oxfordshire waggons '.

If I am right in interpreting him to mean especially the curved surboards, the panelled sides, and the iron staffs, this type continues into Wiltshire, north Berkshire, and Buckinghamshire. In all these districts many waggons of the type may still be seen, though not, I agree, in so finely developed a form. In particular, the shape of many of the iron staffs is similar, although another shape is also common. I have never seen ' balustered ' head- or tail-boards in this area, nor the elaborate shaft-bracings of the ' Glamorgan ' waggon, though I have seen some like them in Lincolnshire. Some of the Wilts, Berks, and Bucks waggons have a ' waist ' or contraction of the body, to give the front wheels more room to turn. This feature is found on very old waggons, the waggon being then called ' half-bedded '.

Typical measurements in Wiltshire are :—Length of floor, 11 ft. 5 ins. ; breadth of floor, 3 ft. 9 ins. ; height of waggon in the middle, from the top to the ground, 4 ft. 9 ins. ; diameter of fore-wheels, 3 ft. 10 ins. ; hind-wheels, 4 ft. 10 ins. ; track, ' out-to-out ', (*i.e.* the distance between hind-wheels *at ground level*, taking the outside of both wheels) 5 ft. 11 ins.

It is clearly of this type that Marshall writes :— ' the Glocestershire waggon is . . . the best farm-waggon I have seen in the Kingdom . . . the wheels run six inches wider than those of the Yorkshire waggon '. Again : ' the Wiltshire waggons run remarkably wide, full five and a half feet from middle to middle of the ruts. I have measured

one near six feet from out to out, . . . they are particularly well adapted to a hillside country '.[12]

This width in west-country waggons was one of the considerations which led Brunel to adopt his Broad Gauge (7 ft.) on the Great Western Railway. He wished his railway to be wide enough to accommodate ' easily ' road vehicles whose width he puts at 6 ft. 6 ins. This was probably a maximum greater than the average, although waggons 6 ft. 6 ins. from out to out are still to be seen. The northern railway pioneers also based their 4 ft. 8½ in. gauge on the common-road vehicles of their neighbourhood. The railwayman's figure is an inside measurement, and corresponds to a wheelwright's out to out figure of about 5 ft. 1 in. The northern gauge appears to be prehistoric, even in England.[13] But what is the origin of the ' western ' waggon track ? Of this type (PLATE VI) the eastern limit, as far as I have been able to determine it, is Tring.

The next type (PLATE VII) is found in western Hertfordshire, Bedfordshire, and Northamptonshire. It is remarkably different. It has a flat, or almost flat, line from end to end. The staffs as well as the struts are mainly composed of wood. The sides are ladder-like, and have boarding on the inside, but they are not panelled. The headboard is detachable, as well as the tailboard. The owner of this waggon told me that it was at least 50 years old, and that it had been the usual type round Ware and Hertford. It must be rare in that district now, for it required searches covering three years to find this specimen. (There are still many of them in Northamptonshire.) It was in ' good running order ', and three of its wheels had been sent to the wheelwright at the end of the harvest, a practice for which Sturt pleaded in vain. Their absence gave an exceptionally clear view of the construction of the waggon, though depriving it of much of its beauty. A clumsy repair has been made to the main timbers of the body. The measurements of this waggon were :—length, 10 ft. 6 ins. ; breadth, 4 ft. 3 ins. ; height, 5 ft. 4 ins. ; fore-wheel, 4 ft. 3 ins. ; track, about 6 ft. This type was seen a little south of Stamford, but not north of it.

A third type (PLATE VIII), still common in the Lincolnshire Wolds, is quite different. It has a curved outline, producing a lofty front,

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[12] *Rural Economy of Glocestershire*, 1789, and *Rural Economy of the Southern Counties*, 1798.

[13] R. E. M. Wheeler, 'A Prehistoric Metropolis', ANTIQUITY, June 1932.

which is often elaborately painted, with the names and addresses of maker and owner, the date, and ornamental scroll-work. The date may be that of a rebuilding, and not of the original construction. Iron staffs are again the rule, quite different from the ' Glamorgan ' pattern. The surboards of the waggon shown are attached to cross-bars, and are removable. This arrangement is not uncommon, though in some waggons they are integral. The one illustrated here was described by the wheelwright who was repairing it as a ' real old standard '. He put its age at 100 years, saying that he had recently repaired for further service one bearing the date 1812.

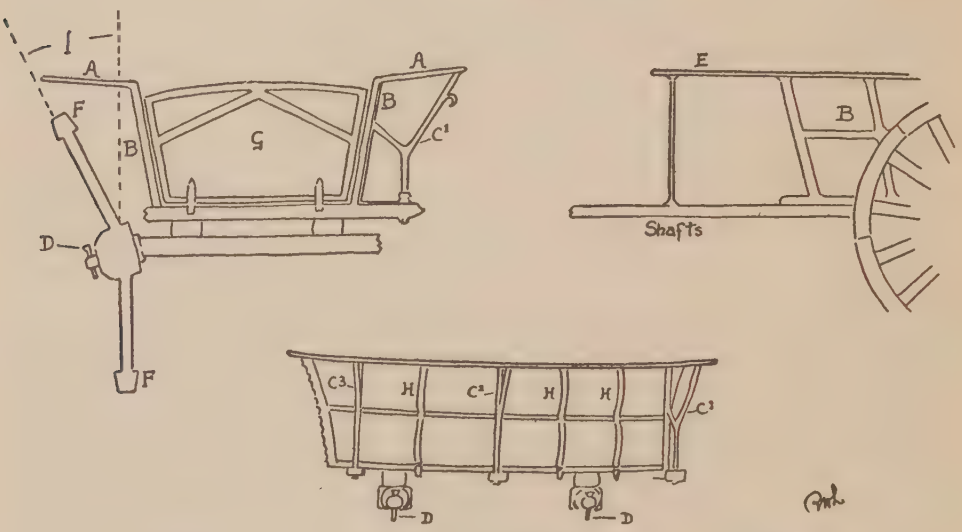
As will be seen, a recess is cut in the side to give the front wheels a little more room when they turn. But perhaps the most interesting point about these waggons is that the great majority of them have wooden axles. This is true of those which seem to be of quite recent make. The wheelwright told me that he had made and fitted several in the last two years, and showed me the worn-out axles which he had taken off. One had caught fire from lack of grease, and was charred nearly through. I was interested to hear him express the opinion that wooden axles were better on ' the land ', but iron ones on a hard road. The preference for these wooden axles in Lincolnshire is quite deliberate, and it is by no means wise to dismiss it as mere conservative prejudice. It is shared by many outside Lincolnshire. I have heard it expressed by a carter, who at the same time was anxious to try pneumatic tyres on farm carts. Such a man is no mere ' laudator temporis acti ', and his opinion, though possibly mistaken, is, after all, the opinion of an expert.

The track from out to out of this waggon is about 5 ft., and it is therefore of just about the same width as those from which originated the 4 ft. 8½ in. railway gauge. Yorkshire waggons, are, as far as I can find out, of similar width. Here we are on the verge of ' the North ', historically a region of survivals, so it is appropriate to find here very many of these veterans. They are well kept still, and to the enthusiast, accustomed in the south to grey timbers and battered sides, it is a splendid sight to see them in the harvest-field, blazing under the noon-day sun, in all the glory of primary reds, yellows, and blues.

Measurements (of this specimen), as before : length, 10 ft. ; breadth, 3 ft. 8 ins. ; height, 5 ft. 2 ins. ; fore-wheel, 3 ft. 10 ins. ; hind-wheel, 5 ft. 2 ins. ; track, about 5 ft.

The choice of suitable terms presents some difficulty. The technicalities of the wheelwright do not, as a rule, solve the problem,

for they differ in different districts, and are often applied to more than one part of the vehicle. For the moment, those terms whose meaning is not obvious are, I hope, sufficiently defined by the following diagram. The term ' waggon ' is used exclusively to mean four-wheeled vehicle, a use which is convenient, and, I believe, correct.



A, surboards
B, sides
C, 1, 2, 3, hind-, middle-, and fore-staffs
D, linchpins
E, front gallery
F, felloes
G, tailboard
H, struts
I, angle of dish

The diagrams are not intended to represent any actual vehicle, nor are details drawn to scale.

Megalithic Grave-Monuments in the Anglo-Egyptian Sudan and other parts of East Africa

by E. E. Evans-Pritchard

THIS note describes megalithic grave-monuments among the Mise tribe* to the west of the Nile in Amadi District of Mongalla Province, Anglo-Egyptian Sudan. I visited this tribe in the early part of 1927.

The megalithic monuments described are typical of Mise country. They may be found occasionally among other members of the southern group, the Oggi and Endri, but there possibly they mark the graves of Mise who have died out of their country. The Kederu have probably adopted the heaps of stones and carved wooden posts which they and their neighbours set up over graves. Today these appear to be the predominant types in Kederu country though they are sometimes found in association with pyramids and dolmens which may be the true Kederu forms. It seems likely that they are the true Kederu forms because Kederu speak a dialect identical with that of the Mise, and because dolmens are also found among the Madi who are nearer in speech to the Mise and Kederu than other members of the Moro-Madi language group, among whom, to the best of my knowledge, pyramids and dolmens have not been recorded. Moreover Emin Pasha recorded both pyramid and grave-monuments among the Kederu half a century ago.

* The Mise are generally known as Moro but this term has really a geographical rather than an ethnological significance and, as is so often the case in Africa, has been applied to several tribes speaking unrelated languages and with distinct cultures. Of the tribes commonly referred to as Moro the northern group (Moro Kodo, Nyamusa, Biti, and Wira) speak dialects belonging to the Bongo-Mittu group of languages, while the southern group (Moro Mise, Moro Kederu, Moro Endri, and Moro Oggi) speak a dialect of the Moro-Madi group of languages which includes also the Madi, the Kaliko, the Abukaya, the Logo, the Lendu, and the Lugbwara. I may refer the reader to Professor and Mrs Seligman's *Pagan Tribes of the Nilotic Sudan* for further information about the ethnology of this area.

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The Mise monuments have been mentioned by a number of travellers whose statements are transcribed in this paper. The account by Wilson and Felkin was accompanied by drawings but, as far as I am aware, the only photographs of the megaliths which have been published were taken by myself.[1] Most of my knowledge is contained in the photographs and I can add little by way of commentary. I have recorded elsewhere what is known about the grave-monuments of neighbouring peoples to the west of the Nile in descriptions of their customs and beliefs in general.[2]

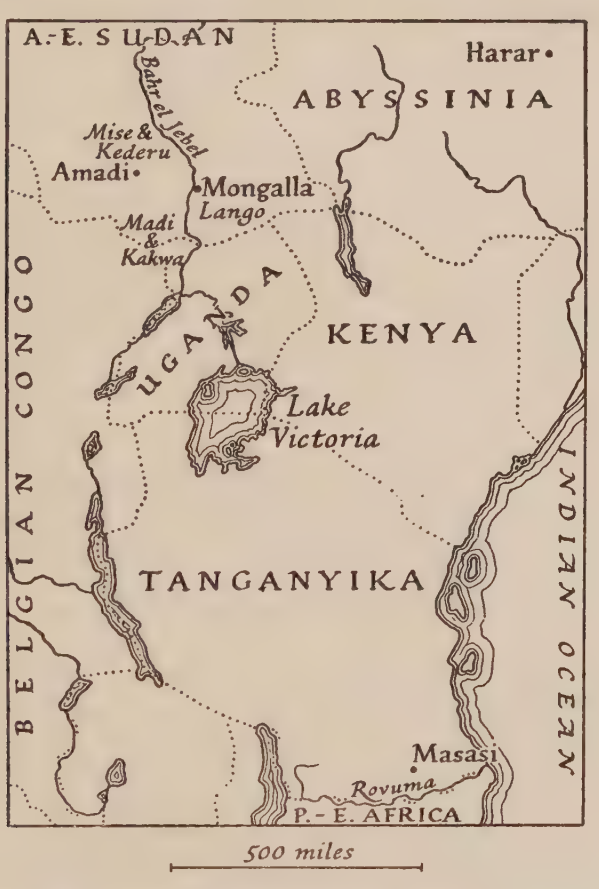
FIG. 1. MADI GRAVES
(from 'Uganda and the Egyptian Soudan', by C. T. Wilson and R. W. Felkin, 1882, II, 123)

Felkin writes of the 'Lorus', evidently the Moro Mise, of the neighbourhood of Zanga and Kadru, that they have megalithic monuments. 'No signs of life were visible, and the absence of large trees

[1] C. G. Seligman. *Ency. Brit.*, 14th ed., article 'Africa: Archaeology and Antiquities', and C. G. and B. Z. Seligman, *Pagan Tribes of the Nilotic Sudan*, 1932.

[2] 'The Bongo', *Sudan Notes and Records*, 1929; 'The Mberidi and Mbegumba of the Bahr-el-Ghazel', *Sudan Notes and Records*, 1931; and 'Notes on the Bongo-Mittu group of peoples' (to appear in the same journal).

was remarkable ; the ground was sandy, and contained a good deal of iron-stone. Six small streams were crossed, none being of any importance. We noticed a great number of graves on the road, all of which were marked by stones ; sometimes the stones were placed so as to form a kind of pyramid, at other times one flat stone was put upon six or eight others placed in a circle '.[3]



The drawings, reproduced opposite, which accompany Wilson and Felkin's account, are entitled Madi graves, a most unfortunate nomenclature since the people of this area are Mise and not Madi. As the Mise speak a dialect of the Madi language this might seem a

[3] C. T. Wilson and R. W. Felkin, *Uganda and the Egyptian Soudan*, 1882, vol. II, p. 123.

futile objection if it were not that Wilson and Felkin describe the people living still further to the north, and speaking dialects of a different language, as Madi also, and it is from this people that their Madi vocabulary was taken.[4]

Indeed it is often far from clear about which people Wilson and Felkin are writing. Elsewhere Felkin speaks of the ' Madi or Moro tribe ' who live in a tract of country situated Lat. 50° N, Long. 30° 20′ E, of which the chief town is said to be Bengue. In speaking of their graves he mentions ' a conical mound of earth, three or four feet high, which is stabbed by flat stones '.[5] It is difficult to know precisely what is meant by ' stabbed by flat stones '.

Speaking of the Kederu, Emin Pasha wrote : ' The village of Mollo is situated near this *khor* (Labikko), in the midst of corn-fields. I noticed there many trees hung with skulls and horns. Unfortunately these trophies were obtained only from dwarf antelopes and beasts of prey, which appear to abound in the vicinity. From a lofty pole in the centre of the village the skin of a python fluttered in the wind. The numerous graves round the village could be recognized by pyramids formed of slabs of rocks or by huge heaps of stones, from the centre of which rose a pole, with three notches in its upper extremity, which were shaped exactly like those which are seen on the ancient Mohammedan tomb-stones in southern Arabia. I saw occasionally a third form of grave enclosed by slabs of stone arranged in a circle, so as to support a larger slab, thus forming a kind of table. The care which the Mittu and Kederu devote to their graves constitutes a fine trait in the character of these tribes, who differ in this respect very favourably from the Bari and Dinka '.[6]

Stigand wrote of the Mise : ' On the march to Saruru stones and rocks are plentifully strewn about, and these are used to mark the sites of graves, of which there appear to be numbers in every direction. The most frequent design is a flat rock, placed like a table, resting on four or six long stones planted upright in the ground. Another arrangement is a small ring of upright stones like a miniature Stonehenge. As such pigmy monuments are practically unaffected by time or weather, it is not surprising that in course of time the whole country should be covered

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[4] Id. vol. I, pp. 352–4 and ' Notes on the Madi and Moru Tribe of Central Africa ', by Robert W. Felkin. *Proc. of the Royal Soc. of Edinburgh*, 1883–84, XII, 303–53.

[5] *Proc. of the Royal Soc. of Edinburgh*, 1883–84, p. 327.

[6] *Emin Pasha in Central Africa*, 1888, pp. 356–7.

with them. I do not remember seeing anything of the same sort anywhere else in Africa ; the *Madi* kinsmen of the *Moru* do nothing to mark the site of a grave '.[7]

From the descriptions of Wilson and Felkin, Emin Pasha, and Stigand, it appears that there are at least two types of grave-monuments found among the Mise and the Kederu. We may refer to them as the pyramid type (since it has been so described by previous writers) and the dolmen type.

The structure of the pyramid type of grave in Mise country is evident from the photographs (FIGS. 2–3) which accompany this paper, so that only a short verbal description is required. They consist of slabs of flat white granite leaning together in pairs one above another with one slab much taller than the rest pointing either to the rising or to the setting sun. If the grave contains a man the stone pointer leans to the east, whereas if it houses a woman it points to the west ; because when a man rises from sleep he shades his eyes and looks to the rising sun which marks the beginning of a hunter's day ; whereas when a woman wakes from sleep in the afternoon, she shades her eyes to the west, for when the sun goes down in the west she prepares the evening meal.

Some of the monuments I saw had three central stones leaning against each other, one of them being considerably taller than the other two and pointing east or west, and against these three central stones were propped many smaller slabs of granite. Others consisted of two large slabs, one being the pointer and overlapping the other and leaning against it. Against these two slabs were propped two other large slabs pointing north and south. Other and smaller slabs were placed at varying angles and in haphazard fashion around these four central stones.

The pyramids are generally taller than a man and some must be over ten feet in height. The longest stone pointer I have seen is shown in FIG. 3. It marks the grave of Beliyiye, father of Chief Yilu, at Lui. The other photographs of pyramids are all of women's graves.

Enclosed within these high pyramids one sees only a small heap of earth, but there are also graves which consist of a large earth mound with flagstones covering it so as to resemble a sloping pavement. In these graves the stones are supported by the heap of earth on which they lie and there is not always a pointer.

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[7] Major C. H. Stigand, O.B.E., *Equatoria, the Lado Enclave*, 1923, pp. 51–2.

Among the Mise one observes many small pyramids about two feet high built in the same manner as the larger pyramids but on a smaller scale. These mark the graves of children. One also sees small mounds of earth uncovered by stones just outside huts. These are graves of infants. Still-born infants have three small pegs driven into the ground above their grave. All graves are dug within the homestead enclosure.

The dolmen type of grave consists of a ring of generally three, four, or five, upright stones with a large slab placed over them so as to give the appearance of a table. Their form is clear from the accompanying photographs (FIGS. 4, 5). I have never seen the small ring of upright stones described by Stigand, nor has Dr Fraser, of the Church Missionary Society Mission in Mise country, ever seen them. Possibly the surmounting slab had in the case of some dolmens been knocked over by elephants.

This type of grave is used for first-born children. The grave of a boy has three and that of a girl four stones. There are sometimes more than four stones but Dr Fraser told me that it is only the number three or four which is significant of the sex of the deceased. If a first-born child dies very young a dolmen is erected over his grave and the next child, having a peculiar social status, will, on his death, have erected over his grave a peculiar monument consisting of a heap of stones with a large slab of granite forming an upright pointer in the centre. I visited a newly-erected monument of this kind. It consisted of a huge heap of stones some ten feet high, in which was placed an upright slab of granite facing though not pointing to the east. It appears also (though I am not sure of this) that it is sometimes the first child to die who may be commemorated by a dolmen grave.

Stigand's statement that this is the most frequent type of grave is misleading. Admittedly the number of graves of this type that one sees in the bush is numerically out of all proportion to the presumed ratio of first-born children to other children born, and indeed it may be more frequently seen there than the pyramid type of grave. But in the neighbourhood of villages, graves of the pyramid type far out-number those of the dolmen type.

The dolmen type is likely to prove more durable, indeed it is almost indestructible ; whereas the pyramid type may be upset in course of time. The earth mound which supports the smaller stones may be washed away by heavy rains, or the level of the ground may sink since there is a grave below, or the stones may be knocked down by elephants

and possibly by other large beasts. In the dolmen type, on the other hand, the upright stones are protected from rain by a flat stone placed over them. Nevertheless natives say that they are sometimes knocked over by elephants.

I have seen pyramidal constructions in the bush in all stages of decay. Sometimes only the earth mound has been washed away while sometimes all the slabs of granite have fallen to the ground. How many years usually elapse before the stones fall I cannot say, but my impression is that they fall much more rapidly than one would suppose judging from the state of many of those in villages vacated only a few years ago. However, they probably outlast the memory of the man or woman whose resting place they mark and the stones may then be taken away for the construction of new graves. On the other hand, all the dolmen graves I have seen have much the same appearance, whether they are new or old.

In some parts of the country flags of granite are found in a natural state having split off from the rock outcrops, as for instance in the neighbourhood of Lanya, whereas in other parts of the country they have to be blasted, as at Galia. Wood is piled up on an outcrop of rock and a large fire kindled. When the fire is at its fiercest cold water is poured onto the heated rock, which splits along the line of water flow. By this means it is possible to obtain granite slabs of the size required for the construction of pyramids.

Stigand's statement that ' the Madi kinsmen of the Moro do nothing to mark the site of a grave ' is undoubtedly incorrect for we have several descriptions of megalithic monuments and a photograph of a dolmen from Madi country.

Emin Pasha refers to Madi grave-monuments in two passages but he describes a form different from those found in Mise country. ' The night before our arrival a leopard had made its way into the little village and killed a man, consequently we had the opportunity of witnessing a funeral. A circular hole, about three feet in diameter, and about five feet deep, was dug in front of one of the huts and the corpse, clothed in a skin, was placed in it in a squatting position, with arms and legs drawn up. Then earth was shovelled in and stamped firmly down, and the grave was covered with stone slabs.[8] The second passage runs as follows :—' In the middle of the village, which consists of the usual small Madi huts, infested by bugs, the mother of the reigning chief is buried ; a flat stone and several long poles, on which hang

[8] *Op. cit.* p. 260.

amulets, mark the grave. The father of the chief is buried at the entrance of the village, his grave being marked by an upright stone about seven feet high, and a post notched at its upper end '.[9]

A photograph of a dolmen grave-monument which accompanies an article on Madi rain-stones by Mr F. H. Rogers is said to be a photograph of graves of former rain-chiefs; it shows a dolmen like those of Mise country (see FIGS. 4–5) and what appears to be a ring of stones without a table surmounting them, like the rings of stones mentioned by Stigand[10]. Mr J. H. Driberg tells me that he has seen a dolmen-like structure, consisting of two uprights and a slab across them, at the village of Kenyi Karalla in Kakwa country in Uganda. The Kakwa are classed as Bari-speaking, and as they are adjacent to the Madi it is possible that they have borrowed dolmens from this people. This is probable because neither the Bari proper nor any of the other Bari-speaking peoples (Shir, Kuku, Mandari, Nyangwara, Fajelu and Nyefu) are known to possess dolmens. Mr Driberg cannot say whether this dolmen-like structure was a grave-monument or not.

Though no further examples of pyramid and dolmen grave-monuments are known in the Anglo-Egyptian Sudan, the miniature dolmen-shrines present at the door of every hut among the Lotuko-speaking Lango of Mongalla Province, to the east of the Nile, must be mentioned. These are called *natifini* and Professor and Mrs Seligman describe them as ' miniature cists about a foot high, resembling rough museum-models of dolmens. They are usually erected at the side of the house soon after it is built, the master of the house being responsible for upkeep. In addition there are, near the entrance of a hamlet, other *natifini*, in which the whole community is interested since communal rites are performed at them '.[11] Colonel Lilley furnished the information that, among the Lango, graves are always to be found close to the stone cists and that ' the body is interred on its side with the feet towards the *natifini* '.[12] It may be that the *natafini* are connected not only with the cult of ghosts but also with a spiritual being called Naijok. Mr Driberg recorded that ' some *natifini* have conical grass roofs over them, and that annual sacrifices are made at the *natifini* to preserve health '.[13] These stone cists cannot be called grave-monuments though they are associated with graves.

[9] *Op. cit.* p. 261.

[10] F. H. Rogers. ' Notes on some Madi Rain-stones ', *Man*, 1927, no. 58.

[11] Seligman, *op. cit.* p. 353. Two photographs and a drawing are shown.

[12] Id. p. 354. [13] Seligman, *op. cit.* p. 354.

The monolithic circles which occur in villages of the Lotuko and some of the Lotuko-speaking tribes have no relation to graves and are quite unlike the pyramids and dolmens of the Mise. The stones are usually small but may be up to three to four feet high. ' These are built at the present day and are squatting places for the men '.[14] A photograph of one of these squatting places among the Lokoiya, reproduced in *Pagan Tribes of the Nilotic Sudan*, reminds one strongly of Islamic praying-places in Egypt.

There is a report of dolmens in the Ruvuma country of the diocese of Masasi to which Mr Robert Webb has kindly drawn my attention. Mr Webb tells me that the country from which they are reported lies near the Tanganyika-Portuguese East Africa boundary. These are known as *ndwika* and a native informant knew of three of them. One was described as ' very large and flat, big enough for me to lie on. I slept on it that night. It stands on three legs like a stool '. Of the others this native said : ' there is another *ndwika* on the road to Tunduru but that is not flat and it stands on one stone, not three. And there is still another about half an hour's walk from Lulindi. The little river which crosses the road from Luatala is called Ndwika because of the *ndwika* stone which is near to it. The people say that it is the work of spirits. It has been like that for a long, long time. Even the oldest men cannot remember the time when it was not there '.

One of these stones, that near Lulindi, was visited by Miss M. Roe and Miss Gibbons of the Universities' Mission to Central Africa and is shown in FIG. 6, by the courtesy of Mr Webb and the editors of *Central Africa*. Miss Roe described it as follows : ' It is in the forest away from any path. The large flat stone stands not on another stone but on an ant-hill. The top is piled up with little stones, almost certainly put there by people as offerings to the spirits '.[15] It would appear likely that denudation and erosion are responsible for the position of this particular stone and that it is not due to human agency. It is possible, however, that there may be supporting stones round which termites have built.[16]

Dolmens have been discovered in fair profusion in southern Abyssinia by R. P. Azaïs about 150 kilometres southeast of Harar, and

[14] Id. p. 307.

[15] M. Roe, 'Ndwika Stones'. *Central Africa*, May 1930, p. 93.

[16] Mr Webb informs me that authorities at South Kensington and elsewhere, whom he has consulted, do not favour the supposition that the stone rests on top of a termite mound.

menhirs are abundant in various parts of southern Abyssinia.[17] Of the dolmens the Rev. Father Azaïs and M. R. Chambard write ' On peut constater leur parfaite ressemblance avec mégalithes analogues de France qui ne diffèrent pas eux-mêmes des autres dolmens trouvés un peu partout, aussi bien dans les pays scandinaves qu'en Afrique du Nord. Un des dolmens a été fouillé et a fourni, outre des ossements humains, des fragments de poterie, un anneau d'argent et un gros grain de collier de métal massif, très lourd (Octobre 1922). M. Pottier, qui a examiné les photographies envoyées par le P. Azaïs, lesquelles viennent de paraître dans *L'Illustration* (30 Mai 1925), ne pense pas possible d'assigner une date aux dolmens d'Abyssinie. Ils peuvent d'après lui, être beaucoup plus récents que ceux de France, qu'on place à la fin de la période néolithique et au début de la période du bronze, vers le second millénaire avant Jésus-Christ '.[18]

This summary has been quoted to show that while the dolmens of Abyssinia are grave-monuments they are of considerable age and do not appear to be erected by peoples of present-day Ethiopia.[19] It seems that the megalithic grave-monuments of the Mise and Madi are unique in Africa as contemporary structures.

It must be mentioned, however, that Dr Küsters compares Mise dolmens with similar forms in Madagascar : ' Madagaskar bietet mit den Gräbern der Vornehmen eine ähnliche Form. Auch hier werden durch kunstliches Erhitzen und plötzliches Abkühlen grosse Steinplatten abgesprengt, diese in Kammerform zusammengestellt und die " Grabmutter ", eine besonders grosse Platte, darüber gelegt '.[20]

The Editor wishes to acknowledge with many thanks the help received from Dr C. G. Seligman and from the Royal Anthropological Institute, during the author's absence in the Anglo-Egyptian Sudan.

[17] R. P. Azaïs et R. Chambard, *Cinq Années de Recherches archéologiques en Ethiopie*, 1931. See also A. Kammerer, *Essai sur l'Histoire antique d'Abyssinie*, 1926, and *Le Mer Rouge l'Abyssinie et l'Arabe depuis l'Antiquité*, 1929. Some of Father Azaïs' results were previously published in *La Géographie*, July-Aug. 1927, pp. 1–39 under the title of 'Exploration archéologique en Ethiopie méridionale, Mai-Novembre 1926 '. See also article by M. E. Pottier in *L'Illustration*, 30 May 1925 and 16 April 1927 and an article of M. Ravaise in *La France Illustrée*, 27 October 1923.

[18] R. P. Azaïs et R. Chambard, *op. cit.* pp. 172–3.

[19] Amongst the many megalithic monuments of Abyssinia are some phallic menhirs (see Azaïs, plates 69–80). It may be worth recording that phallic menhirs have also been reported from the western (French) Sudan, on the plateau of Tondidaro, region of Niafunke (see Octobon, *Statue-Menhirs*, p. 558). EDITOR.

[20] P. M. Küsters, ' Das Grab der Afrikaner ', *Anthropos*, XIV–XV, 1919–20.

Pyramids and their Purpose*

II. The Pyramid of Khufu (the great pyramid)

by Noel F. Wheeler

Late Field Director, Harvard-Boston Expedition

As measurements play a certain part in this article it is as well, before dealing with the pyramid of Khufu, to consider the ancient Egyptian measures.

Different values of the cubit or ell (referred to as E), are found in different sites, and in different structures of the same site and period ; but it seems quite certain that the Pyramid Age ell had a value between 20.58 and 20.63 in. In later times the variation is much wider. Opinions differ on the division of the ell, since there was also a ' short ell ' of 6 palms or hands (referred to as H), whereas the normal ell was divided into 7 hands. Most authorities take the ell of 20.58–20.63 in., divided into 7 hands of 2.94–2.95 in. each ; and for the short ell, 6 hands of the same value, giving the value of the short ell as 17.64–17.68 in. But Junker (*Giza* I) gives a normal ell of 20.64 in., divided into 6 hands of 3.44 in. each ; this last is not quoted elsewhere. Petrie (*Ancient Egypt*, 1930) gives good reasons for believing that the normal ell was used in the pyramid of Khufu and most other places, but that the pyramid of Khafré (2nd pyramid) and the South Pyramid at Dahshur utilized the short ell of 17.656–17.76 in. In the table of measurements of the pyramid of Khufu (see pp. 183–5), the average value of the ell is 20.614 in., and the division into 7 hands produces nearly double the number of cases of whole numbers of ells compared with the 6-hand division ; so that it may safely be assumed that the former is the one used by the builders.

The hand was divided into 4 fingers or digits, each of .75 in. There were also in use, according to Borchardt, a large span of 10.35 in. and a small span of 8.59 in.

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* The first article of this series was printed in the March number, pp. 5–21.

A table of the values of the ell, found or deduced by various authorities at various sites, is given on page 183.

There is a cubit measure, of the New Kingdom, which measures 20.59 in., in the Cairo Museum (no. 452).

Measurements of the Great Pyramid—its passages, galleries and chambers—will be found in detail on pages 183–5.

The Pyramid of Khufu (figs. 1–4)

This pyramid stands on a rock-plateau forming the eastern edge of the Libyan desert, about 5 miles from the village of Giza, from which it gets its modern locality-name. The rock-plateau is approximately 100 feet above the cultivated plain and 197 feet above sea-level.

It is built on a square base, of which the sides differ in length by only about an inch ; the average side is 755 ft. 9 in. (440 E), the height above the base platform is 481 ft. 10 in. (280 E), or rather *was* this height originally. No further measurements will be given here in other than ancient Egyptian ells, hands and fingers.

The core masonry is built in level courses throughout of limestone blocks, and the whole was cased in fine white limestone from the ancient quarries near what is now Turrah, on the east side of the Nile, 12 miles from the Pyramids. After a few years' exposure this limestone mellows to a cream colour.

The original entrance is in the north face some 30 E above the base, and is at the upper end of a long passage descending at an angle of about 26 degrees through the core of the pyramid and into the rock for a total length of 220 E. At its foot, after a short horizontal stretch, is a rough unfinished rock-hewn chamber. From the roof of the Descending Passage, at about 50 E from the entrance, rises the Ascending Passage, also at an angle of about 26 degrees. This Ascending Passage opens out at a little less than half its floor-length into the Grand Gallery, their floors being continuous in the same line, to the centre-line of the pyramid ; from this point there is a short horizontal passage passing through the Portcullis Chamber into the King's Chamber. From the junction of the Ascending Passage with the Grand Gallery a horizontal passage leads to the Queen's Chamber, which is on the pyramid centre-line. From this same junction a wandering well-shaft descends, vertically in places, to an opening in the west side of the Descending Passage near its foot.

Descending Passage (figs. 1–2)

This resembles the usual entrance-passage and leads to what in other pyramids is the one and only burial-chamber cut in the rock. It differs from others only in that the burial-chamber is unfinished, that the ascending passage leads off it, and that the well-shaft opens into it. In the small horizontal passage at its foot, just short of the chamber-entrance, is an unfinished enlargement which gives the impression of being an embryo portcullis recess ; and in the chamber is an unfinished pit, and a blind extension of the horizontal passage for a distance of over 30 E. The angle at which the Descending Passage slopes is quite usual, that of the Third Pyramid and of one of the small Queens' Pyramids being within $\frac{1}{2}$ a degree of it. The passages of the Giza, Dahshur and Meydum pyramids are all between 21 and 34 degrees.

Ascending Passage (figs. 1–2)

This passage, which has the same cross-section as the Descending Passage (2 E, 2 H high ; 2 E, 1 F wide), has its entrance in the roof of the latter passage. This opening was concealed originally by the insertion of a single block of limestone which formed an indistinguishable part of the passage roof. It remained in place until the plundering of Caliph Al Mamoun in A.D. 820, when it fell, and the sound of its falling led his excavators to tunnel into the Descending Passage. Immediately above the position of this fallen stone are now three granite plug-blocks, with a thin film of plaster between their faces and the passage which they otherwise exactly fit, and similar plaster between the blocks.

Above this point the passage has no special features except the three Girdle Stones, which are part of the masonry forming the four faces of the passage, but are of granite, while the normal passage masonry is of limestone. The roof of the passage ends with the beginning of the Grand Gallery, the floor continues into the gallery and ends at a point perpendicularly opposite to the termination of the roof.

Grand Gallery (figs. 3–4)

This is the largest individual space in the pyramid, some 91 E long, its floor being a direct continuation of that of the Ascending Passage, but the height extended to 16 E. The side and end walls taper inwards as they rise, at about 20 on 1. This slope, or ' batter ', is that used in a number of enclosure walls of temples, etc., and is attained in the gallery by overlapping the courses, 7 overlaps in the upper end wall and

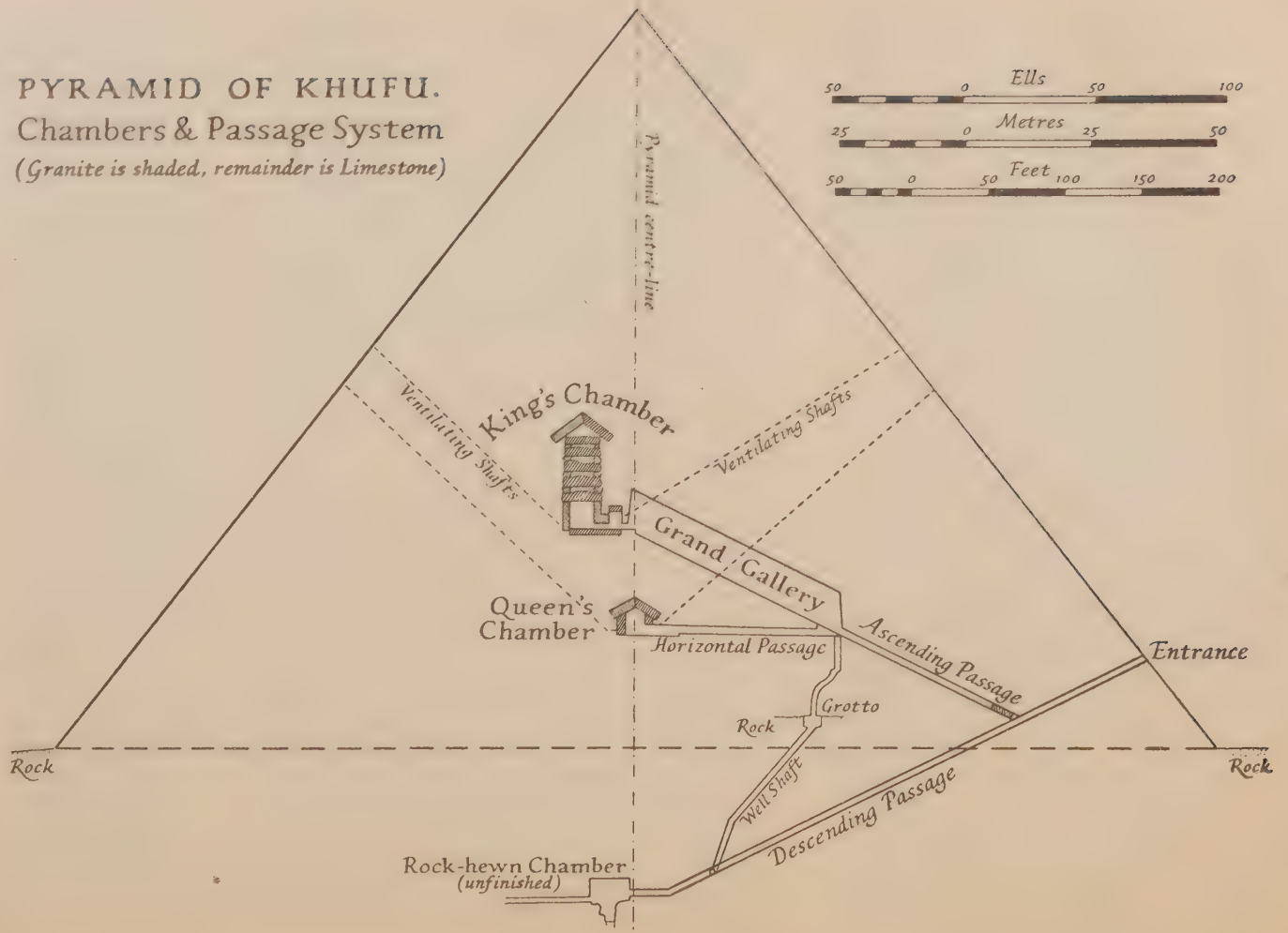

PYRAMID OF KHUFU.
Chambers & Passage System
(Granite is shaded, remainder is Limestone)
50 0 Ells 50 100
25 0 Metres 25 50
50 0 50 Feet 100 150 200
Pyramid centre-line
Ventilating Shafts
King's Chamber
Ventilating Shafts
Grand Gallery
Queen's Chamber
Horizontal Passage
Ascending Passage
Entrance
Grotto
Rock
Rock
Rock
Well Shaft
Descending Passage
Rock-hewn Chamber
(unfinished)

FIG. 1

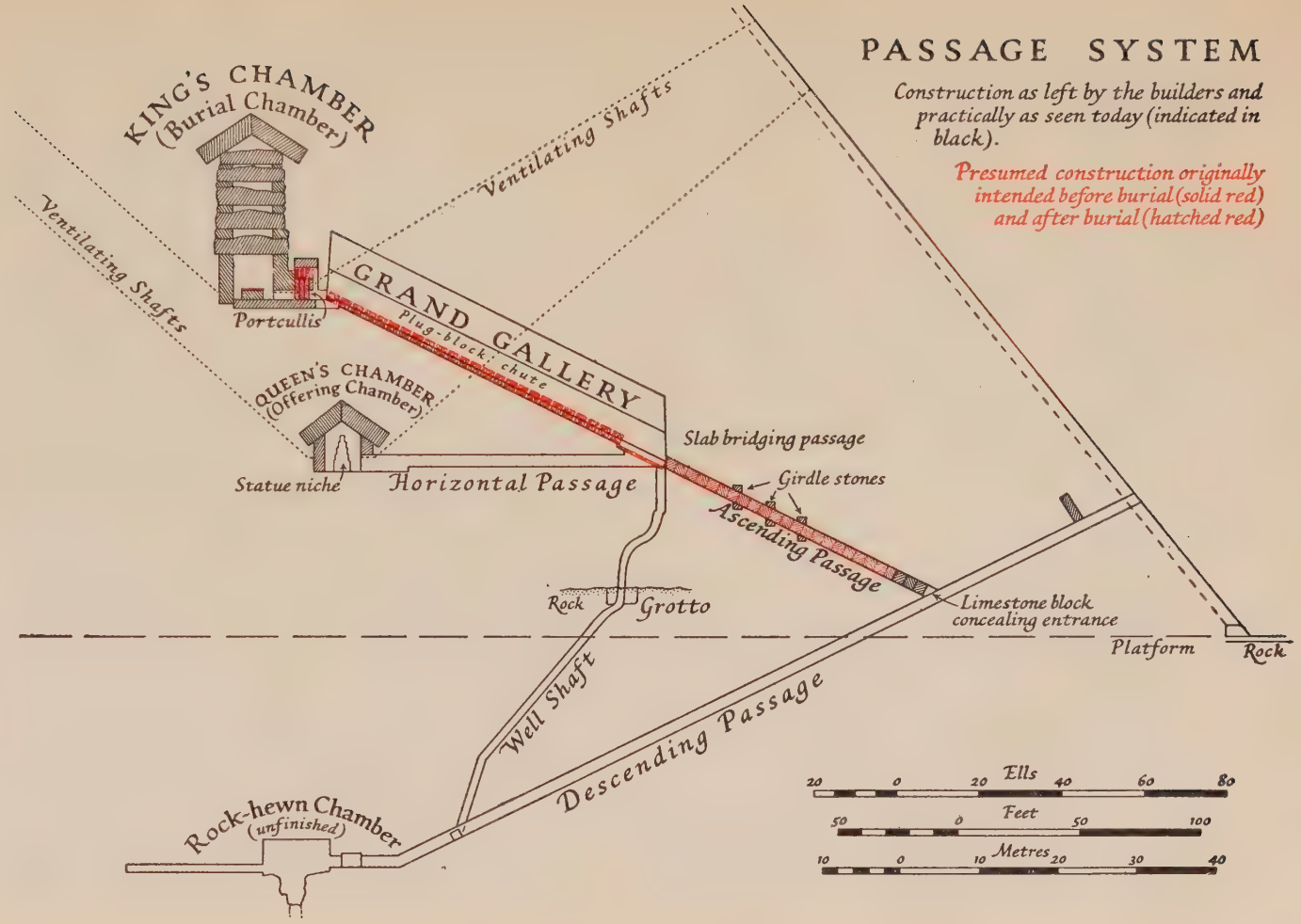

PASSAGE SYSTEM
Construction as left by the builders and practically as seen today (indicated in black).
Presumed construction originally intended before burial (solid red) and after burial (hatched red)
KING'S CHAMBER (Burial Chamber)
Ventilating Shafts
Ventilating Shafts
GRAND GALLERY
plug-block chute
Portcullis
QUEEN'S CHAMBER (Offering Chamber)
Slab bridging passage
Girdle stones
Statue niche
Horizontal Passage
Ascending Passage
Rock
Grotto
Limestone block concealing entrance
Platform
Rock
Well Shaft
Descending Passage
Rock-hewn Chamber (unfinished)
20 0 20 Ells 40 60 80
50 0 Feet 50 100
10 0 10 Metres 20 30 40

FIG. 2

6 in the lower. The roof stones are similarly overlapped, the slope of the gallery itself being nearly 1 on 2 and the slope of each roof block 1 on 2.2. The same method of overlapping is found in the statue-niche in the Queen's Chamber, and was no doubt intended, like the six superimposed ceilings of the King's Chamber, to give rigidity under great load.

The floor of the gallery is made into a chute for the plug-blocks by the addition of a shallow ramp up each side, leaving a channel in the centre of the same width as the Ascending Passage. In the upper surface of these ramps, at equal distances apart, are 28 sockets. In each side wall, at a vertical height of 8 E and 5 H above the floor (about 16 feet) is a shallow longitudinal groove running the full length of the gallery. At the lower end of the gallery the floor stops short at the drop where the Horizontal Passage leads off to the Queen's Chamber, and at this point there is a recess in the floor for a large slab to rest, bridging the distance to the top end of the Ascending Passage and making one continuous floor therewith. The sockets in the side walls for 5 supporting beams to this ' bridge '-slab are visible. At the upper end, the floor of the continuing passage intrudes horizontally into the gallery for about 3 E, forming what is known as the Step : this, as all the masonry of the Grand Gallery, is of limestone.

The only other notable feature is the entrance of the well-shaft. With the structure complete this shaft was not visible, but is uncovered by the removal of the lowest stone in the construction of the western ramp. The shaft descends a little over 1 E vertically, then travels horizontally outwards from the gallery, and finally drops vertically down. With the missing ramp-stone and the bridge-slab in position there would be no indication of the entrance to the well, but by lifting the bridge-slab a small opening would show in the side wall of the Horizontal Passage. From the state of the floor at the beginning of the Horizontal Passage, and from the step down of 1 E from it to the inner end of the passage-floor, it is clear that the Horizontal Passage floor is unfinished, and would have had the greater depth throughout its whole length when completed. In this state the floor would have been on the same level exactly as the floor of the short horizontal section of the well-entrance and there would have been an opening nearly 2 E high and 2 E wide in the side of the Horizontal Passage beneath the bridge-slab ; so that a person in the Grand Gallery had no need to remove the ramp-stone to gain access to the well, but merely to lift the bridge-slab.

Ante-Chamber

This consists of a horizontal passage from the upper end of the Grand Gallery at the level of the top of the Step, to the King's Chamber, which passes through the space for housing the portcullis. The passage itself is slightly smaller than the others in the passage system, and is of limestone construction from the gallery to the commencement of the portcullis recess, but of granite thereafter.

The portcullis recess is of granite on all sides except that of the entrance from the gallery, which is limestone. It is just over 7 E high and 6 long, and contains the slide grooves for three portcullis slabs to descend vertically on to the floor ; the face of the south wall is also grooved for the passage of the innermost portcullis slab. The slides are empty, and have clearly never been used. Immediately outside the outer portcullis grooves is the ' granite leaf ', which consists of two superimposed granite slabs in a groove, the bottom of the lower slab being exactly level with the roof of the entrance passage. That this was not a portcullis slab is clear from the fact that it has no grooves to slide downward from its present position ; from its different thickness from the actual portcullis slides ; and from its two-piece construction which would have been a joy to plunderers.

When the portcullis slabs were dropped there would have been a space left vacant above them equal in height to their descent (the height of the continuing passage) ; it would have provided a means for robbers to gain access to the tops of all three slabs, where their destruction would have been greatly facilitated. It is possible that the ' granite leaf ', either by being pushed *up* (there is a boss on the upper section which would have made this easier), or by having a third section added at the top, would have served the purpose of concealing the vacant space over the portcullis and effectively sealing the entrance on all sides with granite.

King's Chamber

This burial chamber, entirely of granite, has five superimposed roofs, each consisting of a number of massive granite beams bridging the side walls of the chamber and free from the end walls. Above the upper layer of beams is an angular vault roof of large slabs. This construction, adopted no doubt with the idea of rigidity under heavy load, creates five low spaces between the various roofs, which were named by Howard Vyse in 1837 when he had tunnelled up from the

LOWER END OF GRAND GALLERY

To illustrate launching of plug blocks

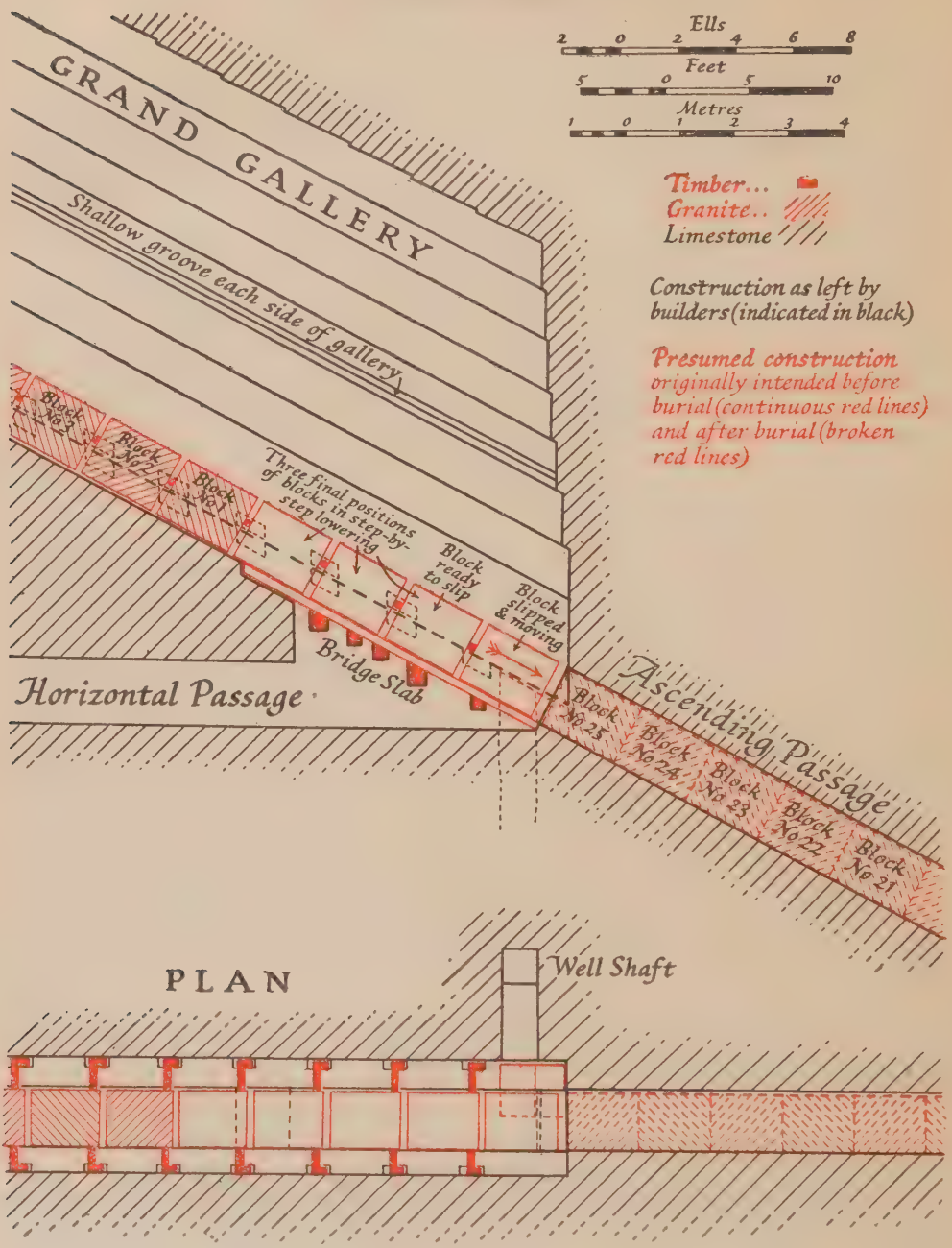


Fig. 3

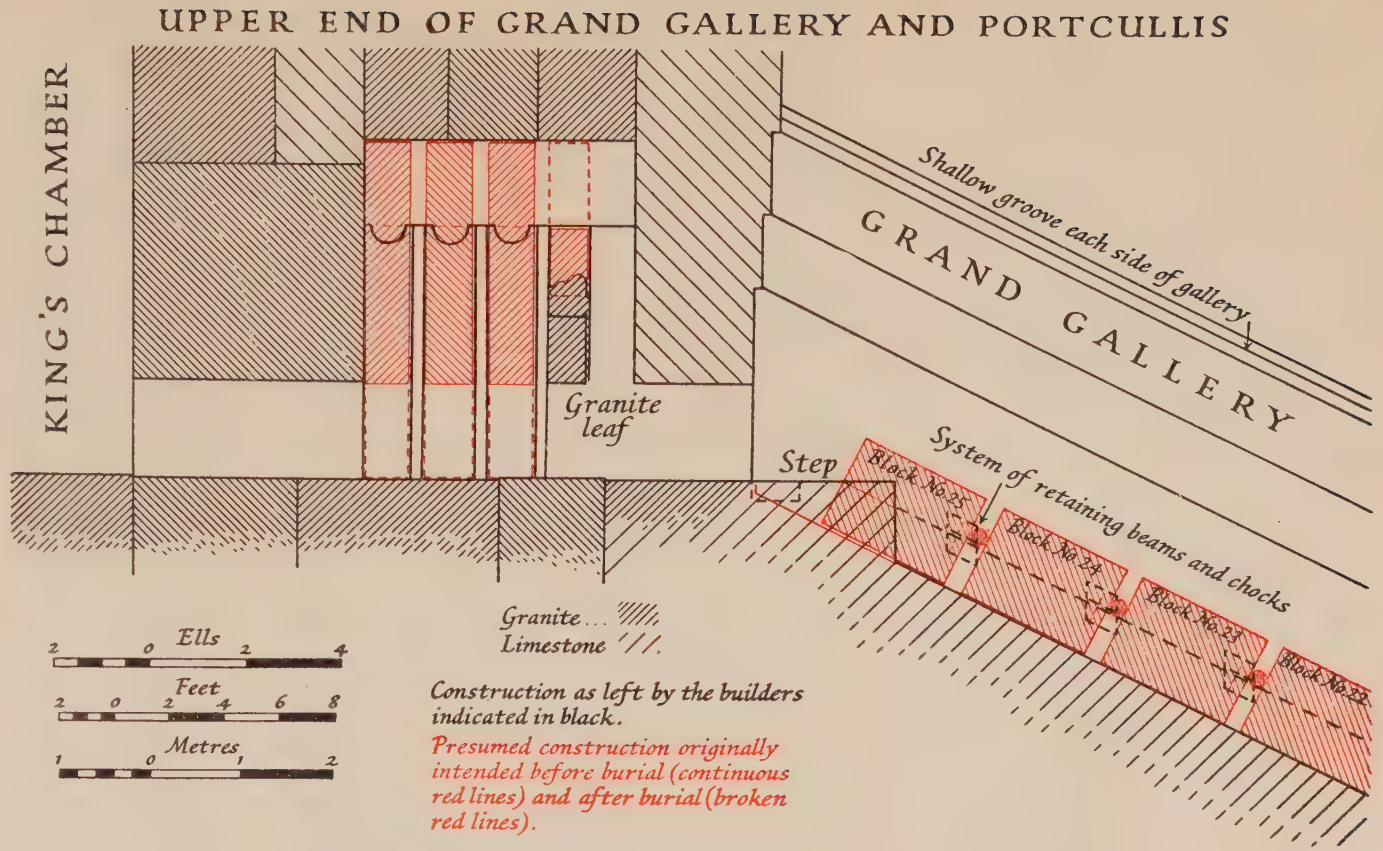

UPPER END OF GRAND GALLERY AND PORTCULLIS
KING'S CHAMBER
Granite leaf
Shallow groove each side of gallery
GRAND GALLERY
Step
Block No. 25
Block No. 24
Block No. 23
Block No. 22
System of retaining beams and chocks
Granite ...
Limestone
Ells
Feet
Metres
Construction as left by the builders indicated in black.
Presumed construction originally intended before burial (continuous red lines) and after burial (broken red lines).

FIG. 4

lowest to the upper chambers. The lowest chamber, 'Davison's Chamber', was found by Davison in 1765 when he discovered the break-through to it from the upper corner of the Grand Gallery: there is no evidence to tell us when this break-through was made. These Chambers of Construction are among the few places where the unworked backs of masonry are visible, always an interesting find since the red paint marks put on the blocks in the quarries are likely to be still on the stone, as they are in this case. It is common to find in these inscriptions the king's name, the date, and the name of the gang who cut the stone, since the Egyptian quarrying was organized on a very efficient system of checking throughout each block's journeyings, to the time of its resting in its final place in the structure. Here, in the Chambers of Construction, we have the name of Khufu and the names of a number of gangs.

There is an unfinished sarcophagus in the King's Chamber—broken, lidless, uninscribed—and it was so found by Caliph Al Mamoun in A.D. 820 when he made the first break through the masonry of the pyramid since its original closing. The fact of being without inscription is not in itself strange, since this fashion was in use at the time. The alabaster sarcophagus of the king's mother had no mark on its surfaces, though those of his sons and daughters followed both fashions—inscription and lack of it. The present writer is not aware of the bottom of the pyramid sarcophagus having been examined; but in the case of the king's mother there was a sign twice repeated in sunk relief, in some way significant to the men who made the sarcophagus, cut in the underside—a chisel (identical with an actual chisel in copper found in her tomb).

The remaining feature of the King's Chamber is the existence of two ventilating shafts, one low in each side-wall, which ascend through the pyramid masonry at a steep angle and emerge through the face of the pyramid about 190 E up the face from the platform level.

Horizontal Passage

This passage runs from the junction of the Ascending Passage with the Grand Gallery to the Queen's Chamber. Its floor is only finished at the inner end, where it is level with the floor of the chamber and its height is just over 3 E, the outer end being 1 E above the remainder and the height here about 2 E. As this latter height is that of the Ascending Passage, it may be that the greater height, which has not

been completed throughout its length, was originally intended to admit the ' ka '-statue of the King by way of the then unroofed Grand Gallery. The niche for this statue is in the west wall of the Queen's Chamber.

Queen's Chamber

This chamber, 11 E long, nearly 12 E high, and exactly 10 E wide, is of granite and has a vaulted roof similar to that over the uppermost of the Chambers of Construction. It is in the east-west centre plane of the pyramid, while the King's Chamber and the rock-hewn chamber have this plane passing north of them and roughly through their entrance passages. In the west wall of the Queen's Chamber is a tall niche, 3 E wide at its base and tapering by overlapping courses to less than 1 E at the top, and in height exactly equal to the height of the chamber side-walls to the spring of the vault—nearly 9 E. This niche is empty and has been broken away at the back by plunderers hoping to find a way to somewhere else. The Queen's Chamber has a pair of unfinished ventilator shafts, like those in the King's Chamber, but they were only completed to within less than 1 H of the chamber walls. Waynman Dixon found them by sounding in 1872 and broke through the remaining thickness of the walls to open them up. The Queen's Chamber has no protection against robbers in the form of a portcullis, but it was probably presumed that the bridge-slab in the Grand Gallery floor was sufficient concealment.

Well-Shaft

As described under ' Grand Gallery ' this shaft descends from the lower end of the western wall of that gallery. Its course is erratic but interesting. After descending vertically for about 10 E it continues down more uncertainly and roughly to the rock-surface, which it reaches in what is now called the Grotto—a natural cave in the rock. From here it wavers a little before settling to a straight line descent at an angle of about 50 degrees below the horizontal, which course it follows to within about 20 E of the point at which it emerges into the west side-wall of the Descending Passage, and about 15 E from the lowest point of that passage. It descends to the level of the passage-floor and then enters it horizontally by a short tunnel. Suggestions as to the purpose of this well-shaft will be considered later.

There are two details which are not described above or illustrated in the plans. The first is the broken passage made by the Caliph

Al Mamoun, who broke into the pyramid-surface in the north face, near the centre, but too low to strike the original entrance—which must then have been invisible as originally sealed up. He broke first into the Ascending Passage alongside the plug blocks, went down further and broke into the Descending Passage, and then returned and proceeded up the Ascending Passage into the inner passages and chambers. The second is the break through from the Grand Gallery to the Chambers of Construction, which goes straight through from the highest point of the side wall of the gallery into 'Davison's Chamber': ancient or modern, and with what purpose is not known.

Pyramid Construction Methods

There have been almost as many different suggestions as to how the Pyramid of Khufu was constructed as there have been writers on the subject, but very few are worth considering. Petrie (*Ancient Egypt*, pt. 2, 1930) suggests a ramp occupying the full width of one pyramid face, and steepened as the work progressed upwards as far as about three-fourths of the pyramid height; thereafter by a zigzag ramp up one face to the top. This ramp would need to have extended a distance of at least 1000 feet outward from one face of the pyramid. On the east is Khufu's royal cemetery (see PLAN p. 188), with the tombs of his mother, his four queens, his sons and daughters; also his pyramid-temple, the work on which must have been in progress during the construction of the pyramid. On the north the edge of the rock-plateau is only about 500 feet from the pyramid. On the south is more of the Khufu cemetery, and the ground drops rapidly at a distance of about 400 feet. On the west is the great western cemetery of the fourth and later dynasties. There is no sign whatever of such a ramp as that postulated, which must have had a mass equal to or greater than that of the pyramid itself; but small construction ramps to some of the fourth dynasty mastaba tombs are still in place in the eastern cemetery or can be traced from their broken sections.

The question of the approach is easily solved since the causeway of the pyramid descended at an easy slope from the pyramid-temple on its east face to the valley-temple which lay somewhere under the modern village of Kafr-es-Saman, at the foot of the rock-plateau cliff. This causeway was made of large blocks of masonry, and its whole course is traceable either by the bed cut in the rock or by the actual masonry which remains where the causeway came up the cliff. At the

time of the inundation the stone could be landed from barges at the valley-temple end.

When we come to consider the means of getting the huge blocks up to the height of their courses on the pyramid we have to think of the methods to which the Egyptians were accustomed, and the easiest way in this particular case. The ramp was the favourite method of getting great weights up to a height: the easiest way of applying a ramp to the pyramid was to use the pyramid-construction itself and leave a 'spiral' ramp in the core structure at an easy inclination such as used elsewhere, encircling the pyramid continuously until reaching near enough to the top. Such a ramp with a slope of 1 on 5, up which the blocks would have easily been moved with levers and rollers, would have risen to within 40 feet of the top in two revolutions round the pyramid: a ramp circling round the pyramid once would have needed to have a slope of only 1 on 3. The suitability of this method is obvious, and one can assume that the Egyptians were ingenious enough to have thought of it, and one can almost presume that this was the method used. The completion of the full height would have been the point at which they would have worked their way back down the spiral ramp, filling in to the finished face as they descended.

Concerning the passage-system, we have a number of unfinished pyramids to refer to, and one of the most definite is that of the first queen of Khufu, the northernmost of the three small pyramids east of his own. This queen's pyramid was originally begun about 100 feet further east than it now stands, and because of its possible encroachment on the area of the secret tomb of Khufu's mother, Hetep-heres, the site was shifted. At the time of this shift the masons had cut into the rock for the beginning of the descending passage to the tomb chamber, and had also cut the sloping bed for the massive stones which were to frame the entrance; so that we know this to have been the usual procedure in commencing a pyramid, and can safely assume that Khufu's own pyramid was begun in the same way. The rock-cutting work was done first and then the superstructure was built over it.

Of the method followed in the casing we have also some very clear examples in the mastaba tombs of Khufu's royal cemetery (eastern). There, from the unfinished sections, tool marks, etc., it has been possible to reconstruct the process pretty completely. When the core masonry was finished, the first course of casing was built up complete, each block being faced level beneath and on the side which was to butt against one already in position; the bedding being levelled to fit each

stone individually. The bedding and the side faces were smeared with a very thin coat of fine plaster, less than a millimetre thick, which served as a lubricant on which the stone could be pushed up for fitting and withdrawn for further adjustment. The final fit of the side faces was helped by the use of a long copper saw, about 5 millimetres thick, which was worked down between the two stones to give a fitting face on each, after which the stone was pushed up against the neighbour and a very fine joint resulted.

The blocks arrived from the quarries *unworked* and with the name, date and gang-name of quarriers painted on one face of certain stones in red ; possibly all stones were marked, since the only face on which such marks can now be found are the unworked backs.

The levelled bed of rock had been previously marked out with incised lines giving the base outline of the mastaba or pyramid, and when the first course of casing was in place the same thing was done on its levelled upper surface, the lines being set back a definite amount for the rise above the lower lines. This was the method always employed by the Egyptians to define, measure or state in writing a given slope, a rise of 1 E on a base of 5 H, etc. Often in scribing these lines two would be marked, one to the correct measure and another about 1 H outside it for the stone-dressers to measure back from in finishing off the surface ; the correct line was of course covered by the outward excrescences of the undressed face of the stone of the course above, until the final facing brought the work exactly to the line.

The subsequent courses of casing were put on in the same way, each being completed before the next was begun, and the structure reached its full height with all the faces undressed. Each face was then dressed from the top downwards as a whole. There were exceptions to this in many instances of inferior workmanship, usually found in the tombs of poorer people or in generally poorer times, but the best work in the Giza eastern cemetery always followed it. It is by far the easiest method of carrying out such work, and would have been entirely suitable for the pyramid of Khufu. Petrie gives as a reason for believing the face to have been finished before erection that the planes of some of the casing blocks differ from that of the contiguous block very slightly ; but there are several other causes which might account for this.

Measures to Defeat Plunderers

From the earliest times Egyptian tombs showed great ingenuity in the attempts to make it impossible, or very risky, for plunderers to

gain access. Usually they were unsuccessful, because the plunderers were even more ingenious, and the true ' secret ' tomb with nothing to show above ground was the only method pretty certain to escape.

The system of sliding plug-blocks down an inclined passage to fill it was widespread over a long period, and there are many examples among the fourth dynasty tombs at Giza ; a noteworthy example is the rock tomb of Wah-ka at Qau, where a very cunning but unsuccessful plug-system was used. The usual procedure of the plunderers was to tunnel alongside the plug-blocks when these were of harder stone than the surrounding masonry : the Caliph Al Mamoun gained entrance to the pyramid in this way.

Another favourite stand-by of the tomb builder was bluff. The tomb entrance appeared to be in one place, whereas the actual approach was elsewhere. The concealed opening into the Ascending Passage of the pyramid is a case in point—the plunderers being expected to go down the normal Descending Passage, find what they thought was the burial-chamber, find it rifled and assume that the burial priests had been before them—as they often were—and leave the rest of the pyramid alone.

The portcullis was another well-used adjunct, and examples of it are found in many places. A large number of the Giza mastaba tombs have a single portcullis at the bottom of a deep shaft in the rock. It was usual also to conceal as well as possible the outer entrance to the tomb. The entrance into the Great Pyramid consisted of a single block of stone which was indistinguishable from the others of the casing-face ; and it was not discovered until after the plundering of 820.

From all this one can see that there was nothing new or unusual in the measures adopted in the Pyramid of Khufu to defeat the robber. It is only in the means of carrying out these measures in detail that the pyramid goes further than most other tombs, the care and thought given to the detail being remarkable.

Original Plan of the Pyramid of Khufu, and Purposes of its Parts

There is some reason for believing that the original design of Khufu was for a pyramid of about 300 E-side (about the same size as that of his father), to contain only the normal passage descending to a burial-chamber in the rock, though this plan must have been discarded for a better one before the superstructure was begun. One indication of this is the height up the pyramid-face at which the entrance is placed.

Some examples of the proportion of this height to the total slant-height are :—

Pyramid of Khufu, as it is	.116
Pyramid of Khafré, upper	.0824
Pyramid of Menkauré	.0632
Pyramid of Khufu, had its face been at the end of the plug	.05
Pyramid of Khufu, 10 E outside plug	.06

This last case would have meant a pyramid of 330 E-base and 210 E-height, multiples of 11 and 7 by 30. The pyramid as it is has the base and height multiples of 11 and 7 by 40, and the Meydum pyramid 11 and 7 by 25.

Another indication is the unfinished state of the ' burial-chamber ' in the rock. This, one of the first works undertaken in the pyramid construction, would scarcely have been left as it is unless discarded. It would even have been a better means of deceiving robbers had it been a convincing burial-chamber and not an obviously unfinished one.

However this may be, it is certain that the present pyramid was built from the platform upwards as one complete design, without alteration, so that the change in plan, if any, must have been made before the platform and base lines were laid out. It seems likely that Khufu, who would have begun plans for his pyramid as soon as he came to the throne, would have taken his ideas from the pyramids of his predecessors and of his father in particular. One can imagine the architect who designed the present pyramid coming to Khufu with his plans and having them enthusiastically approved at once.

When we come to the internal passage-system we find a much more drastic and significant change in the plan, which implies a complete alteration in the purpose to be served by the Pyramid. Before going over the many clear signs of this, however, it would be as well to attempt a reconstruction of the procedure of the burial arrangements as originally intended. The coffin would be carried down the Descending Passage and up the then empty Ascending Passage—a portable ladder of some kind being used to mount from the one passage to the other. On entering the Grand Gallery the slab-bridge would be covering the horizontal passage to the Queen's Chamber, and the procession would probably proceed up the gallery on the plug-blocks which would then have been loaded into their places in the chute. There is accommodation for 25 of these blocks between the cross-beam sockets in the ramps, and 25 blocks of the same size as the three now in the Ascending Passage would have exactly filled that passage to an inch.

NO. 1 block at the time of the burial would have been about half an E above the upper end of the bridge-slab, and NO. 25 about halfway into the space now occupied by the Step at the top of the gallery.

The coffin would then have been taken in under the three portcullis slabs and placed in the sarcophagus. Omitting here any possible ceremonies connected with this, the lid would have been closed and the procession have returned to the pyramid entrance. The Queen's Chamber, which would have had the ' ka '-statue of the King in its niche, would have been the offering-room into which all the offerings, furniture, etc., would have been placed ; whether before or after the coffin's journey up does not affect matters here. On emerging from the King's Chamber the priests would have seen the portcullis slabs dropped into place one by one, the ' granite leaf ' pushed up or built up to seal the space now vacant over the portcullis, and would have emerged from the pyramid, leaving the plug procedure to be carried out by the gangs brought up into the Grand Gallery for the purpose.

Probably the concealing limestone block at the opening of the Ascending from the Descending Passage would be built into place and fixed immovably before the plug-blocks were released, but it is also possible that a temporary measure for checking the plug-blocks at their stopping position was used, and the limestone block put up afterwards. In any case the plug-blocks would have been lowered, NO. 1 first, step by step, from ramp-socket to ramp-socket, until each lay in the lowest position in the chute. Then each block would have been released when it reached this position, to slide down the Ascending Passage and bring up against the rear of the preceding block. A thin liquid plaster was used between each pair of blocks, and this was probably put on immediately before slipping each block.

Now we come to an interesting point. What about the gangs who were doing the plug-block work, when the first block went home ? Were they expected to remain to die of starvation or suffocation ? It is possible but by no means probable at this period. It is here suggested that the well-shaft was expressly constructed for their escape, either with or without the knowledge of the highest officials. If without, one can well imagine the representative of the workmen concerned getting hold of the right subordinate official at an early stage of the Pyramid construction and ' squaring ' matters. It is possible that, before the pyramid superstructure was begun, they established themselves at the Grotto in the rock surface and tunnelled down to a point near the base of the abandoned Descending Passage, where no one

would be likely to see too much of their operations. Then, as the courses of the pyramid rose, they were able with the connivance or help of the right man to have the upper part of their shaft left as a small gap in each course put in. The slight ' wandering ' of the well-shaft may be due to their efforts to make a negotiable passage rather than a sheer vertical shaft which would have been a hindrance and danger to their projected escape : the vertical 20 feet or so at the extreme top would have been due to the local foreman having at that point realized where the lower end of the Grand Gallery was coming in the building.

With the well as an escape, the gangs had only to lift the bridge-slab, get down the well-shaft, seal the lower end with a block prepared, and emerge from the pyramid entrance when most expedient to themselves and those ' in the know '. Some time subsequent to this the sealing-stone would have been placed in the entrance and the pyramid be a finished task.

Assuming the above to have been Khufu's original intentions, we find a number of strange things in the actual pyramid. The details will be gone over and these discrepances noted :—

Entrance. The sealing stone must have been put in place, since Al Mamoun could not locate the true entrance.

Concealing block at foot of Ascending Passage. This was heard to fall by Al Mamoun and he found it later in the Descending Passage.

Bridge-slab. No trace of the actual slab is known, but it may well be that the workmen, when they lifted it for their escape, toppled it down the Ascending Passage and Al Mamoun removed it with his general tunnelling work. That three granite blocks have made their trip down implies that the bridge-slab did exist then.

Grand gallery. There is a ' rail '-like groove along each side wall at a height of about 10 feet above the tops of the housed plug-blocks, which would well have carried a flooring of rafters for the tackle needed in handling the blocks and placing them. The sockets in the side ramps continue down past the bridge-slab recess to the end of the gallery, implying a step-by-step descent of each block to this point. There is a break through from the upper end of the gallery to the lowest of the Chambers of Construction over the King's Chamber. It was found by Davison in 1765, but whether it is Al Mamoun's work, or later or earlier cannot be said. If earlier it would have been original, and there seems no point in that. The Step at the upper end of the

gallery is the interesting point here, since it encroaches on the area which would have been required for plug-block 25 in the uppermost socket position. It must therefore be unfinished and not completed as originally intended.

PORTCULLIS. This is clearly unfinished. There are no portcullis slabs, and the ' granite leaf ' is incomplete as it is now.

KING'S CHAMBER. The sarcophagus is obviously unfinished. The worked faces are very poor, and the lid was never present, since the first to break into the pyramid found it missing then. He also found no trace whatever of burial, offerings, pottery, etc., and one can presume the chamber to have been empty but for the sarcophagus itself.

HORIZONTAL PASSAGE AND QUEEN'S CHAMBER. The floor of the former is apparently unfinished, being originally intended to be 1 ell deeper. The niche in the chamber is and has always been empty of statue. No mass of offerings or furniture was ever in the chamber, or there would certainly have been mention of Al Mamoun's having found it. The two ventilation-shafts from the sides of the chamber to the outer casing of the pyramid were only completed to within 5 inches of the inner face of the walls, and did not connect with the room until Waynman Dixon broke them through in 1872.

WELL-SHAFT. The lowest ramp-stone on the west side of the Grand Gallery has been removed and there is no record of when this was done. It could have been done during the escape of the working gangs, since the uncompleted Horizontal Passage floor made the opening under the bridge-slab rather small otherwise ; it may have been done by Al Mamoun's men. No trace has been found of the actual stone. A sketch in Davidson's *The Great Pyramid* is referred to as evidence of the ramp-stone having been forced out from *below*, but this sketch and an examination of the surrounding stonework *in situ* show quite clearly that the stone was prized out from above, *i.e.*, from within the Grand Gallery. There is a better sketch in Edgar's *The Great Pyramid*, but in both sketches, as in the original, the breakage of edges and corners shows that a crow-bar or something of the kind was used on the right and left sides of the stone and above it at the back, to prize it out of place into the gallery. The greatest efforts were made at the side contiguous to the Ascending Passage opening, no doubt because the workers knew of the inclined seating of the stone which would release it best in that direction. There is not so much as a mark *underneath* to show any attempt to raise the stone from below, and in the confined space of the little narrow passage there to the opening of the well-shaft

proper nothing but a modern ' jack ' could have forced the stone upwards, and would not have caused the breaks on the adjacent stones on the gallery side. To anyone who has had experience of prizing blocks from masonry or working heavy stones through confined spaces it is obvious at a glance that the men who removed this ramp-stone were in the Grand Gallery.

In Mr Davidson's book it is claimed that the well-shaft was tunnelled vertically upwards from the foot to the Grand Gallery in later dynasties for a tour of inspection of tombs. Since the main Pyramid entrance was intact there would be no reason at all for such an inspection according to Egyptian lights, as their later inspections were to ascertain whether robbers had gained access or made attempts to do so. A vertical shaft such as the well, driven upwards, would have been an entirely un-Egyptian method. Had they possessed the detailed plan of the building, as the accurate arrival of the shaft at both ends implies, they would have certainly tunnelled up alongside the plug-blocks—especially as it would be known that only three blocks existed, or, if Al Mamoun's account means what is said of it, that only limestone blocks had to be dealt with after the first three ; the intersection of the well-shaft with the Grotto on the rock-surface would then have been mere coincidence.

Taking all the above signs of lack of finish—3 plug-blocks only out of 25, Horizontal Passage floor unfinished, Queen's Chamber niche empty, Step uncut for receipt of plug-block 25, no portcullis slabs fitted, no lid to the sarcophagus, no reported trace of body, bones, offerings, pottery, etc., and uncompleted ventilating-shafts to Queen's Chamber—one is justified in presuming that a change took place in the purpose during construction. One can say, in fact, that this change must have taken place when the Grand Gallery roof was yet unplaced, when the King's Chamber also was open, and the roof-slab of the portcullis recess not yet in position. This would have been when the main mass of the Pyramid had reached about the 34th course, to allow the Grand Gallery floor to be completed high enough to accommodate three plug-blocks at least. The central part of the pyramid, including the King's Chamber, portcullis recess and remainder of Grand Gallery, would have risen at the same time above the 34th course probably to about the 50th to the 55th. It may well be no more than a coincidence, but there is one of those changes of course-depth, which occur many times in the height of the pyramid, at the 35th course ; and it is the most noticeable change in the whole series. There is an interesting article

on these course-depth changes, and an explanation, in Petrie's *Ancient Egypt*.

Until fairly recently there was no outside evidence of the existence of circumstances which might have caused such a change of plan; but from the information obtained from the excavation and recording of the tomb of Khufu's mother, Hetep-heres, certain conclusions have been reached which do supply an adequate reason. A sufficiently full account of the work on this tomb will be found in the Bulletin of the Boston Museum of Fine Arts.[1]

To sum up the facts which emerged :—Hetep-heres was the daughter of King Huni of the third dynasty, wife of Seneferu, and mother of Khufu. She died in the reign of Khufu and was buried by him near the pyramid of her husband at Dahshur. Plunderers got at this tomb and their depredations were discovered too late, in that they had opened the sarcophagus and removed the body with the jewellery which was on it. The fact—of the robbery but probably not of the missing body—was conveyed to Khufu, and by his orders a secret tomb was commenced at once and finished roughly at great speed, situated in the most important point in his own royal cemetery at Giza. The tomb consisted of a vertical shaft, 100 feet deep in the rock, leading to a rock-hewn burial-chamber, and was situated alongside the causeway of Khufu's pyramid, nearer to it even than the pyramid of the first queen of Khufu, and with the whole vast cemetery of his queens and children behind it. The shaft was filled solid with courses of fine limestone masonry in plaster of Paris, and the top course was of irregular pieces of the local nummulitic limestone, so that its secret was kept safely from the day of the re-burial until A.D. 1925.

One can imagine the feelings, and to a certain extent the actions, of Khufu on hearing of his mother's tomb at Dahshur being attacked. One can imagine also that the responsible officials at Dahshur were in a very uncomfortable position, but that they affirmed strongly to the King that no real damage had been done, and kept silent as to the contents of the alabaster sarcophagus which was re-buried.

The idea of a secret tomb for the burial and a normal tomb with superstructure for the public to see was not a new one—Seneferu most probably had done the same thing, as others did after him—and if we put ourselves in Khufu's place I think we should cast quizzical eyes at our own pyramid from that day. There would certainly be ample

[1] Supplement to vol. XXV (May 1927), and XXVI, p. 76.

reason for setting to and altering the whole intention of the pyramid ; to continue the work so that outward seeming should not be changed while saving unnecessary work by omitting what was no longer essential in the construction, and devising some entirely unsuspected site for the actual burial. Possibly, and probably, the number of persons aware of the reason for the change in plan would be very few—the King himself, and his most trusted officials only. It would have been quite in keeping for him to have arranged for a public ceremony at his funeral and a dummy burial in the pyramid, while those entrusted with the task buried him as previously planned where none other saw it.

This leaves us with the obvious question—where was Khufu buried ?—the question remaining to the many who have arrived by one route or another at the conclusion that he was not buried in his pyramid.

No tomb has yet been found at Giza which could have been his. At one time the idea was circulated (it is in Edgar's *Great Pyramid*) that the tomb near to the Sphinx, called ' Campbell's Tomb ', had been that of Khufu ; but this tomb is now known to be of a very much later date. Taking the procedure adopted with Hetep-heres, one can assume that Khufu would probably have chosen a position within the boundary of his royal cemetery, which limits are clearly defined, but this area has been almost entirely excavated down to the rock. The possibilities lie in the ' almost '. There is, for instance, a pre-Khufu quarry alongside and beneath his causeway, which has been filled in with large blocks of limestone and gypsum. This was done presumably to give a level floor for Khufu's causeway, which crosses it, and the filled quarry lies within a few yards of the tomb of Hetep-heres. The clearing of this would be a difficult, laborious, and expensive task ; but it cannot be said that there is nothing there but a filled quarry until the quarry has been emptied.

The area of the pyramid-temple has also remained unexcavated so far, though there appears to be little left beyond the basalt floor, across a part of which thousands of tourists trek yearly to the Sphinx, and perhaps the lowest courses or other traces of some of the walls. There seem to be no other possibilities so far as we know at present. That there was a problem connected with Khufu's place of burial was known in later Egyptian times, when the fact that the Great Pyramid was his work must have still been well known ; and the question was then put into writing as to who knew the places of burial of Im-hetep, Seneferu and Khufu, as though it were an oft-repeated query.

NOTE I

Table of values of the ell as deduced by various authorities at the sites mentioned

inches	
20.45	Borchardt. Nile gauge at Kuboschia. Late date.
20.47	Erman and Grapow. Berlin Dictionary.
20.58	Borchardt. Great Pyramid. (4th dynasty).
20.59	Average of 67 examples found by the present writer in the 4th dynasty tomb at Giza numbered G.1225B by the Harvard-Boston Expedition.
20.60	Borchardt. Great Pyramid burial chamber. (4th dynasty).
20.63	Petrie. Great Pyramid burial chamber. (4th dynasty).
	Davidson. 'The Great Pyramid: its Divine Message'.
	Junker. Various places in Giza west cemetery. (4th dynasty).
20.61	Petrie. Great Pyramid. (4th dynasty).
20.662	,, Meydum Pyramid. (4th dynasty).
20.67	Borchardt. Ne-user-rè. (5th dynasty).
20.72	Reisner. Average of 3 examples in 'Mycerinus'. (4th dynasty).
20.78	Newton, according to Borchardt.
20.77	Petrie. Pyramid of Menkauré. (4th dynasty).
20.80	Borchardt. Nile gauge, Edfu. Late date.
20.83	,, ,, Luxor. ,,
20.86	,, ,, Kuboschia. ,,
20.94	,, ,, Elephantine and Esneh. Late date.
20.98	,, ,, Taifa. Late date.
21.07	,, ,, Taifa. ,,

NOTE II

Measurements of the Great Pyramid

The inch measurement is given in brackets; the first column of figures gives the ells, the second column the value of the ell to account for this to the nearest finger. The authorities for these measurements are:—Cole, *Survey of Egypt*, paper no. 39, 1925; Borchardt and Petrie in various publications; Morton Edgar, *The Great Pyramid*, 1924; Davidson, *The Great Pyramid*, 1927.

The average value of the cubit in all these measurements is 20.614 inches.

	Ells of 7-hands E	H	F	Necessary value of ell, in inches
THE PYRAMID				
Mean of 4 base lengths (9069)	440	0	0	20.61
Height from platform to apex (5782.2)	280	0	0	20.65
DESCENDING PASSAGE				
Total floor length (4535)	220	0	0	20.62
Vertical rise (1854)	90	0	0	20.60

DESCENDING PASSAGE—contd.	Ells of 7-hands E	H	F	Necessary value of ell, in inches
Horizontal displacement (2719)	132	0	0	20.60
Vertical rise from junction with ascending passage to entrance (495.8)	24	0	0	20.66
Floor length of horizontal passage at foot	17	0	0	20.63
Height of floor of original entrance above platform (325.2)	32	3	0	20.59
ASCENDING PASSAGE				
Total floor length	75	0	0	20.60
Floor length to bottom of plug-blocks (1471)	71	0	0	20.71
Total vertical rise (680.3)	33	0	0	20.62
Horizontal displacement (1391)	67½	0	0	20.61
Perpendicular height (47.36)	2	2	0	20.61
Vertical height	2	4	0	20.60
Length of plug of 3 blocks and 2 joints	8	4	2	20.62
Length of one plug-block and joint (59.43)	2	6	1	20.60
GRAND GALLERY				
Overall floor length (1884)	91	2	0	20.64
Floor length to Step (1815)	88	0	0	20.63
Intrusive floor length of Ascending Passage	1	1	2	20.61
,, ,, ,, ,, ,, ,,	1	0	1	20.61
Horizontal displacement of total length (1689)	82	0	0	20.60
Horizontal displacement to Step (1629)	79	0	0	20.62
Vertical rise in floor to Step bottom (840½)	40	6	0	20.57
Vertical rise to top of Step (876½)	42½	0	0	20.62
Vertical height (339.25)	16	3	0	20.65
Perpendicular height	14	5	1	20.67
Floor width (82.5)	4	0	0	20.64
Width of plug-block chute (41.98)	2	0	1	20.61
Depth of plug-block chute (perpendicular)	1	0	½	20.61
Length of bridge-slab recess (244.6)	11	6	0	20.62
Length of upper seating for bridge-slab (40.1)	1	6	3	20.61
Length of plug-block chute, bridge to Step (1546.9)	75	0	2	20.61
Length of 25 plug-blocks (1486)	72	0	3	20.61
Necessary projection of block 25 into area occupied by Step (38)	1	6	0	20.61
Maximum thickness allowable for inter-block retaining beams (8.57)	0	3	½	20.61
Intervals between similar points of beam sockets in sides of chute, each to house one block and one beam (68)	3	2	1½	20.71
Length of 1 plug-block (59.43)	2	6	1	20.60
Width of plug-block (41.8)	2	0	1	20.61
Height of plug-block (47.2)	2	2	0	20.61
Height of Step face (36.01)	1	5	1	20.59

GRAND GALLERY—contd.	Ells of 7-hands E	H	F	Necessary value of ell, in inches
Face of Step from end wall of gallery (61.01)	2	6	3	20.58
Step above platform level of pyramid	82	0	0	20.63
ANTE-CHAMBER				
Portcullis recess, length	5	5	0	20.59
,, ,, height	7	1	0	20.59
Outer passage length (52.04)	2	3	3	20.59
Inner passage length	4	6	0	20.59
Height of portcullis sections and slides (103)	5	0	0	20.60
Height of outer passage (43.71)	2	0	3½	20.61
Thickness of portcullis units	1	0	0	20.59
KING'S CHAMBER				
Length (412.5)	20	0	0	20.63
Breadth (206.3)	10	0	0	20.63
Height (230.5)	11	0	0	20.67
Height of each course of masonry (47.1)	2	2	0	20.60
SARCOPHAGUS				
External length (89.71–90.01)	4	2	2	20.59
,, breadth (38.65–38.72)	1	6	½	20.59
,, depth (41.16–41.27)	2	0	0	20.61
Internal length (77.93)	3	5	2	20.59
,, breadth (26.79)	1	2	½	20.56
,, depth (34.34)	1	4	3	20.61
HORIZONTAL PASSAGE TO QUEEN'S CHAMBER				
Length (1521)	73	6	0	20.59
Height (46.4)	2	1	3	20.62
QUEEN'S CHAMBER				
Height of side walls	8	6	1	20.59
Height of ' ka '-statue niche	8	6	1	20.59
Height of vaulted roof	11	5	2	20.59
Width of ' ka '-statue niche at base	3	0	0	20.59
Width of chamber (205.8)	10	0	0	20.58
Average value of Ell				20.614

EXPLANATION OF PLAN OF TOMBS

(see page 188)

A ROYAL CEMETERY OF KHUFU in which are the pyramids of three of his queens, the mastaba tombs of two further queens, his sons, daughters, grandchildren, and probably later descendants among the later tombs. The secret tomb of his mother is also here. The cemetery is bounded by the Pyramid of Khufu, his causeway, and the edge of the pyramid plateau on the west, north and east respectively, and has been in course of excavation since 1924 by the Harvard-Boston Expedition (about 117,000 sq. metres are surveyed).

B GREAT WESTERN CEMETERY of mastaba tombs of the 4th dynasty, which has an area of about 255,000 sq. metres. About one-third of this was excavated completely by Professor Junker's Austrian Expedition and the remaining two-thirds have been in the concession of the Harvard-Boston Expedition since before the war. The important part of this has been excavated but not published, except for the publication of the Austrian work; the unexcavated part is not of great importance.

C CEMETERY south of Khufu's Pyramid, consisting of mastaba tombs of the 4th dynasty with later tombs among them. Excavated by the Austrian Expedition.

D CEMETERIES south of Khafré's causeway in process of excavation by Professor Selim Hassan of the Egyptian University.

E CLIFF EDGE of the limestone plateau.

F CEREMONIAL CAUSEWAYS of the three pyramids. Each one led from the upper temple against the east face of the pyramid to the lower or 'valley' temple.

Of Khufu's causeway only the level track in the rock remains except at the point where it goes over the plateau-edge, where the masonry blocks remain. Where it crosses the area of the quarry the floor is of large limestone blocks with which the quarry is filled. The lower end of the causeway is lost beneath the modern village of Kafr-es-Seman, which comes up to the foot of the cliff. The upper end has not yet been excavated and planned. The subway (v on plan) is contemporary and must be about the earliest known subway-crossing of a street. Its existence suggests that the causeway was walled and not open to the general public and that the traffic of priests and interested persons into the cemetery was by the subway. No tombs exist to the north of the causeway and this area was therefore probably not part of the royal cemetery.

AQ ANCIENT QUARRIES. The quarry cutting around the west and north sides of Khafré's pyramid was primarily to level a platform for the pyramid building. The Menkauré quarry has a number of contemporary tombs cut in the rock faces.

T TEMPLES. The valley-temple of Khafré is the so-called Temple of the Sphinx and is of granite. The temple alongside is in process of excavation by the Egyptian Government. The valley-temple of Menkauré is of mud-brick and here were found the slate pair of triad statues of the king (see ANTIQUITY, March 1935, p. 9 and pl. VI). The famous diorite statue of Khafré was found in the 'Sphinx Temple'.

The upper temple of Khufu has not been excavated or planned. The basalt pavement is passed over by thousands of tourists every year, most of whom do not notice it.

The queens' temples are completely ruined, only the foundation cutting of the first, a few stones of the lowest course of the second, and about six feet high of Henut-sen's remaining. Henut-sen's temple was extended in later dynasties and seems to have been in continuous use down to Ptolemaic times, when it had become the temple of ' Isis of the Pyramid '.

The temple of Khafré has been excavated, and that of Menkauré has recently been published (Reisner, *Mycerinus*).

M Tomb of Hetep-heres I, the mother of Khufu. Queen of Seneferu and probably daughter of King Huni of the 3rd dynasty. The only ' secret ' tomb so far found in the cemetery.

Qa First queen of Khufu, name uncertain.

Qb Second queen of Khufu, name uncertain.

Qc Henut-sen, third queen of Khufu.

Qd Nefert-kau, fourth queen of Khufu. Her son was Nefer-maat. Her grandson, Seneferu-khaef, compounded his name with that of his great-grandfather Seneferu, and not with that of Khufu.

Qe Meryt-ites, wife of Seneferu and Khufu.

Sa Ka-wab, eldest son of Khufu, never came to the throne. He married the eldest daughter of Khufu, Hetep-heres II, who survived him; their daughter was Meres-ankh III.

Sb Hor-dedef, son of Khufu. From his tomb an enemy had tried to erase all trace of his name—unsuccessfully.

Sc Khnum-baef, son of Khufu.

Sd Khufu-khaef I, son of Khufu.

Se Unknown.

Sf Unknown.

Sg Min-khaef, son of Khufu.

Sh Sekhem-ankh, son of Khufu who married Ka-aper (not royal).

Si Min-dedef, son of Khufu who married Khufu-ankh (not royal).

D Meres-ankh II, daughter of Khufu.

Ga Seneferu-khaef, grandson of Khufu. Son of Nefer-maat and grandson of Nefert-kau.

Gb Khufu-khaef II, son or grandson of Khufu-khaef I, and therefore grandson or great-grandson of Khufu.

Gc Meres-ankh III, a granddaughter of Khufu. Her mother was Hetep-heres II and her father Ka-wab.

H ANKH-HAEF, who married Hetep-heres II. She was not buried with him or with Ka-wab.

J KHUFU-ANKH, a ' royal acquaintance ' who married Min-dedef.

K DWA-EN-HOR, a king's son.

L KA-EM-NEFERT.

N KHAFRÉ-ANKH (' Tomb of Numbers ').

P PTAH-SEKHEM-ANKH.

W ANCIENT BOUNDARY WALLS OF CEMETERIES.

Mc MOSLEM CEMETERY.

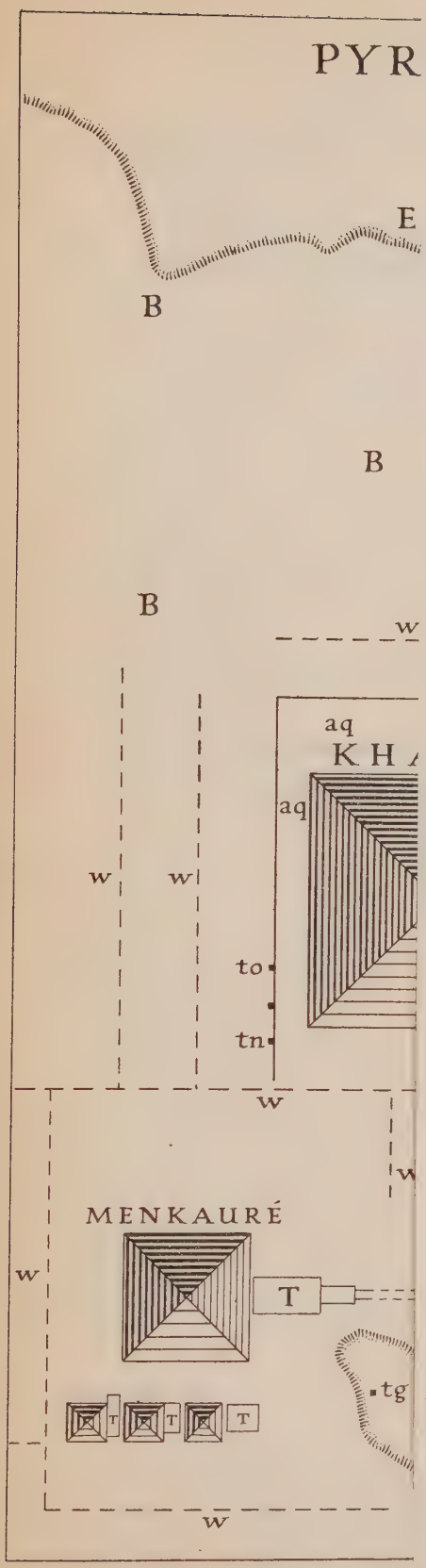
S THE SPHINX, portrait-head of Khafré on lion's body.

X AREA EXCAVATED by the Egyptian Government over 10 years ago and so far has not been published. It is hoped that the records and plans exist since the area has been well ' dumped ' over.

F THREE ROCK-CUT FUNERARY BOATS OF KHUFU. FA is the funerary boat of Khufu's first queen.

Assuming that we have reached the conclusion that Khufu was not buried in his Pyramid, then the probabilities point to his having placed his tomb within the area of his own royal cemetery. When we note the positions on the plan of the secret tomb of his mother, the pyramids of his queens, his ceremonial causeway, and the general ' seniority ' grading of the cemetery from west to east and from north to south, the probabilities again indicate the northwest quarters of this area. The pyramid-temple, and the whole space between the pyramid and the queens' pyramids, are presumably held up by the fact that the main tourist approach to the Sphinx is over them, but eventually they will surely be cleared and the remains of the temple planned. The quarry over the block-filling of which the causeway runs, would present a costly problem if it were to be cleared, but it cannot be definitely said that there is nothing but a quarry until it is laid bare. It must be remembered that the secret tomb of Khufu's mother Hetep-heres was only found by chance in ground already cleared ; the scraping of a camera-tripod leg over the plaster-of-paris between the stones filling her pit-stairway revealed the whiteness of the plaster. But for this one error of judgment of the tomb-builders, in failing to disguise the plaster as they had disguised the masonry filling itself, it is unlikely that the tomb would have ever been found. The pit filling was of fine white limestone blocks laid in courses, but the surface course was of irregular pieces of local rock. Such care in concealment by Khufu of his mother's tomb would suggest that his own tomb will scarcely jump to the eye.

If the final clearance of the whole of the royal cemetery-area should reveal nothing, then we can frankly admit without shame that Khufu has been too clever for us, and wait for chance of new evidence to disclose the place of his burial.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Other tombs marked on the plan.

TA Ra-wer.

TB Kha-merer-nebty, queen of Khafré.

TC Neb-em-akhet, son of Menkauré.

TD Ne-kau-ré, son of Khafré.

TE Sekhem-ka-ré, son of Khafré.

TF Min-yun, son of Khafré.

TG Sebhu.

TH Ra-wer.

TI Wer-khuu.

TJ Ka-meny.

TK Harsiesi (Saite).

TL Nefer.

TM Pa-kap (Saite) ' Campbell's Tomb '.

TN Senezem-ib.

TO Neb-em-akhet, son of Menkauré.

TP Khentet-kau-es, Queen : the so-called ' Fourth Pyramid '.

Mathematics in Antiquity

by Lancelot Hogben

IN a stimulating lecture recently published in Antiquity (1933, VII, 410–18) Gordon Childe raises the question: is Prehistory practical? He suggests that the disastrous social consequences of applying ethnological hypotheses based on flimsy foundations of fact are sufficient justification for insisting on the scientific study of prehistory and archaeology as an essential part of the intellectual equipment of a civilized person in our generation. Current events certainly sustain the justice of his plea. Still it may be argued that there is an even stronger reason, and one which is perhaps more durable, for asserting the claims of such studies to occupy a pivotal position in twentieth-century culture. The publication of Neugebauer's *Vorlesungen ueber Geschichte der antiken mathematischen Wissenschaften** is a timely reminder of the contribution which students of prehistory and archaeology working together can make to the solution of one of the great intellectual issues of our own time.

Modelled on the Cartesian compromise, the culture of Protestant democracy now seems to be approaching eclipse. It is the inevitable fate of a culture in which the man of science pursues his course indifferent to the gargantuan consequences of his own activities, and the man of letters has no prescience of a technological framework that has no precise historical precedent. Behind this fundamental divergence lurks another which threatens the robust materialism of Darwin's generation with an outbreak of mystery-mongering portentous of cultural decay. More and more in all its branches science relies on the use of mathematical symbolism. More and more the mathematician, divorced from experimental study, assumes the prerogatives of the calendar priestcraft in which mathematics had its origin. The reason is not far to seek. The teaching of mathematics makes little appeal to

* Bd. I. Vorgrieschische Mathematik, pp. 212, 61 text-figures. (Bd. XLIII of Die Grundlehren der Mathematischen Wissenschaften in Einzeldarstellungen, edit. by R. Courant). Julius Springer, 1934. 32*s*.

the extroverted and socially alive. It continues to reflect the outlook of the theologians who designed the curricula of our grammar schools. In schools and universities alike those who teach it cling to Plato's doctrine that mathematics is to be studied as an aid to the spiritual refinement of the individual rather than as a social instrument for changing the real world. Since the prospect of spiritual refinement evokes little enthusiasm from healthy adolescents, they usually grow up to find the major part of modern science a closed book ; and must stomach with becoming humility whatever weak-kneed ambiguities of an archaic philosophy are rehashed for them, with a little irrelevant algebra thrown in.

To the furtherance of new methods of intellectual training in which this harmful antinomy of theory and practice in social study and in the apprehension of scientific truth need not exist, no discipline can make a more substantial contribution than prehistory. Darwinian rather than Cartesian in origin, it is humanistic in its scope and naturalistic in its method. The social historian of the written record is always liable to take the dead at their own valuation. Great as are the difficulties which arise from scanty materials, the student of prehistory is at least safeguarded against this pitfall. For him the astronomy (if any) of the men who made the Merrivale stone rows must be assessed by the orientation of their monuments ; their zoology from the animals they domesticated ; their chemistry from the beads ; the pigments and the cosmetics (if any) they used ; their physics from such knowledge of the sledge, the use of rollers or levers as they possessed. What the eldest member of the common-room said about marginal utility or the youngest undergraduate said about the dialectic do not enter the picture. Focussed on a preliterate phase in the pageant of human life, prehistory is forced to adopt a strictly behaviouristic attitude and examine a culture by its fruits. The habit is equally and lamentably rare among the critics and apologists of our own civilization.

One of the tasks with which the founders of our grammar schools were specially concerned was the policy of the open bible. Classical scholarship as an aid to textual exegesis, and incidentally to provide models of compromise between the advantages of democracy and the amenities of slavery, was a necessary ingredient of their programme. The task of our age is to make the world-view of science an open bible. A more general understanding of mathematics is an essential part of our programme. It requires little social imagination to see how mathematics, taught against its historical background of prehistorical

timekeeping and archaeological architecture could be made the most attractive, instead of, as it now is, the most repellent subject in a curriculum of socially essential studies. Posterity may well wonder whether the real asses were those who stumbled over the Pons Asinorum, or those who graduated with honours unscathed by any suspicion of how the fifth proposition could be applied, in the ancient lore of shadow-reckoning, to construct calendar monuments of a geometrical precision challenging the architectural feats of the machine age. The Reformation democratized the art of reading. It is now time to democratize the art of calculation ; and the first step is to dispel the widely prevalent superstition that mathematics was invented by leisurely and idealistic Athenians out of sheer fascination with its utter uselessness.

Neugebauer deserves our gratitude for having written the most scholarly and exhaustive account of mathematics in antiquity before the Greek period. His monograph is an authoritative examination of the textual sources and makes no attempt to trace the origins of ancient number lore and mensuration before the beginning of a written record. It is well produced and abundantly illustrated. What clearly emerges is the magnitude of the task which awaits the student of prehistory. No one would accuse Neugebauer of excessive nominalism. He adopts an essentially orthodox attitude to formalism in mathematical analysis, and repeatedly deplores the absence of mathematical good form in his sources. Still the fact remains that the Babylonians and Egyptians were able to obtain results which represent no mean order of performance. In the art of calculation Babylonian technique was far superior to that of the Attic Greeks. The great antiquity of such achievements and the close association of primitive scripts with the social activity of timekeeping suggest that we must retrace our footsteps a long way beyond the Nippur tablets and the Great Pyramid of Cheops, if we wish to understand the social origins of mathematical studies.

The reader who only wishes to familiarize himself with the main conclusions of Neugebauer's researches, in so far as they throw light on the mathematical attainments of ancient civilizations, will find the ground already traversed in Abel Rey's eminently readable and up-to-date *La Science Orientale avant les Grecs*, where some account of their social relations, especially their association with astronomy, are considered. Neugebauer has reserved the whole subject of ancient astronomy and palaeochronology for a later volume. The earlier histories of mathematics, such as those of Cantor and Rouse Ball, were compelled to base their account of Egyptian mathematics on the

Rhind papyrus and fragmentary references attributed to Democritus and other Greek writers. The contribution of the sister civilization of Mesopotamia was still a closed book. During the past decade a wealth of new material has been added by the elucidation of the papyrus acquired by Moscow in 1912, but only made available by Struve in 1930, and by the decipherment of a large number of cuneiform texts from Mesopotamia. The larger part of Neugebauer's treatise is concerned with the interpretation of the latter.

Guided by the new material, we know that the Egyptians two thousand years before our own era were able to calculate the surface of a sphere with a precision equivalent to making $\Pi = 3.14$ and also the volume of a frustrum of a pyramid on a square base. Babylonian arithmetic just fell short of being an instrument of computation as efficient as our own. The principle of position was used consistently on a sexagesimal scale, each number up to 59 corresponding to some power (positive or negative) of 60. Like the Hindu and Maya notations it employed a zero, which was intercalated to represent a gap in the sexagesimal series, as we might distinguish between 33 and 303. However, it never appears to have been used in the terminal position, as when we distinguish 33 and 330. This step seems to be all that was lacking to make the notation amenable to the Moorish devices we ourselves use. Babylonian arithmetic never actually advanced to the invention of a system of algorithms, though it might well have done so. For rapid calculation tables of multiplication, addition, subtraction, division, squares and progressions were compiled with a thoroughness in keeping with the apparatus of modern computing. The tradition of Greek arithmetic rooted in Pythagorean number-magic had far less in common with our own ; and the Attic numerals, if less cumbersome than this vastly more ancient number-script, were totally incapable of giving birth to the algorithms of which every child of twelve is now the fortunate possessor. Another feature of Babylonian arithmetic is essentially modern. In expressing fractions denominators were not specified. Sexagesimal fractions were used in the same way as we use decimal fractions, except that there was no device like our dot (comma on the Continent) to signify the precise meaning to be attached to a set of figures. Babylonian arithmetical tables, like modern tables of logarithms, left the order of magnitude implied by the symbols to be inferred from the context.

The Babylonian sources, like the Chinese Tchou-Pei and Egyptian constructional geometry, bear witness to the great antiquity of the

so-called Pythagorean relationship between the sides of a right-angled triangle. Neugebauer's cuneiform texts show a proficiency in the arithmetical solution of quadratic equations without further parallel in Greek or Alexandrian mathematics till the time of Heron and Diophantus. It is interesting to speculate upon what the later Alexandrians, like Diophantus and Theon, might have achieved in a different social context. Throughout its whole history the brilliant mathematical ingenuity of Alexandrian astronomy and geodesy was held in check by the incubus of letter symbols which could never become instruments of rapid calculation or even a satisfactory medium for the expression of large numbers. Indeed the superiority of the Babylonian notation draws attention to an issue which has received too little attention from educationists. It forces us to ask how far the much vaunted ingenuity of Platonic geometry, with its concomitant contempt for the art of calculation, was an elaborate compensation (and penalty) for the backward step taken when letters replaced hieratic numerals ? Ranging through all the twelve books of Euclid, there are perhaps a dozen among about two hundred propositions necessary as a preparation for modern mathematics, and these could all be arranged in a consistent series, if the principle of proportion were accepted at the beginning. The most important demonstration in the whole of Euclid's twelve books is the thirty-first proposition in Book I. It is also one which the average school child finds very difficult to remember. According to Rouse Ball, the Pythagorean demonstration was probably based on similar triangles, a method which involves the insertion of one line of construction and two lines of proof. Why did Euclid reserve all propositions about similar triangles to the last book of the geometry of plane figures ? A perusal of the contents of the previous book, now generally suppressed, discloses a simple clue to the order he chose to adopt. The meaning of this long-winded and tedious catalogue of geometrical representations dealing with arithmetical generalities, now assimilated in the nursery or infant's school, is not difficult to detect, if we remember that division was a formidable and elusive operation when all calculations were performed with an abacus, when numbers were used exclusively as labels without operative significance, and when there was no way of representing the convergence of a series of diminishing fractions by the use of negative powers in a positional notation.

Archaeology in Greenland

by Dr Therkel Mathiassen

National Museum, Copenhagen

ARCHAEOLOGY in the Arctic has a charm of its own. The surroundings are unusual : the scenery is magnificent, with high, snow-clad mountains and deep fiords ; the sea is filled with icebergs or drift ice—the sun shines day and night ; seals, whales, caribou, bears, sea fowl and fish are abundant ; and the people are the small dark-haired, brown-skinned, broad-faced Eskimos, the kindest and most helpful people in the whole world.

The work is hard, for the ground is frozen a few inches below the surface ; the sun must thaw the earth, and the layers examined and removed, to expose a new frozen stratum to the rays of the sun. This frozen soil however is an advantage for everything is well preserved for centuries, as in an ice-cellar.

In my attempt to elucidate the history of the Eskimos and the archaeology of Greenland I shall give some account of work, with Eskimo excavations, for two summers in the Canadian Arctic (as a member of Knud Rasmussen's fifth Thule expedition) and seven in Greenland, a long series of adventurous and interesting years.

If the district chosen for excavation is still inhabited it is an easy matter to obtain information as to likely sites, for one has only to ask the Greenlanders. They know their country, on their hunting trips they travel all over it, and they use their eyes well, noticing everything unusual in the terrain ; and they are of course well aquainted with the remains of their forefathers. A Greenlander in Angmagssalik, on the east coast, drew for me a very accurate map of the entire district and indicated on that map more than 100 ruined villages. But that is of course exceptional. Usually one must take a Greenland pilot on a motorboat—or woman's boat—and ask him to point out the ruins of the district ; and he will do it very well. If the country is uninhabited, the problem is much more difficult. But there are many things which may serve as a guide : certain positions are preferably chosen for

habitations—low islands and points—where conditions for building houses are favourable and where there is good hunting. The vegetation often gives hints : the grass is more luxuriant on formerly inhabited spots, where the ground has for ages been fertilized by organic refuse, Not only grass, but also flowers, often of wonderfully bright colours. may cover the old ruins and thus reveal their existence. Green spots on the coast nearly always mean an old house or camping-ground; the older the village is, however, the less luxuriant is the vegetation ; and the oldest remains have the same poor vegetation as the surroundings and cannot be discovered in this way.

Many places must be visited, to find the one best suited for excavation ; last summer, in Julianehaab district, I visited more than 140 old villages. Most of the places are quite small habitations, with one or two houses ; most of them are dating only from the 17th or 18th century. What we require for our purpose is a site with houses which have been inhabited throughout a long period ; then there will be found a large midden in front of the houses, and such a midden is the best finding-place for specimens.

When such a site is found we set up our camp, our party usually being two white people, three or four Greenlanders and a Greenland girl to do the housekeeping. The village is surveyed, mapped and photographed ; the turf of some of the houses and midden areas is removed to expose the black culture-earth to the sun. Now the excavation goes slowly forward ; each day one or two inches are thawed and can be excavated and removed ; the specimens found are dried, prepared, labelled and packed. The uncovered stone constructions—houses, tent rings, meat caches, graves—are measured, drawn and photographed. The stone graves often contain rich finds of grave-goods.

The conditions for excavations are quite different in north and in south Greenland. In the north the ground is permanently frozen from about one foot below the surface, and thawing proceeds very slowly. The excavation takes a very long time ; but on the other hand things are here usually well preserved. In the south there is no frozen ground in the summer, and even in the winter frost and thaw alternates. Excavation can proceed quickly, as in southern countries ; but things are poorly preserved : all wooden and baleen implements have decayed, and often the bone specimens too, so that only a few stone objects are left as a reward for the hard work of the excavator.

Many other troubles have to be faced : in the north large frozen

stones and whale-bones, and the water from the melting ice ; in the south willow and grass roots and often stormy and rainy weather. In Greenland the mosquitoes are an awful torment in July and August, not only the ordinary big mosquitoes, but in late summer there are millions of small, stinging flies, which get into eyes, ears, nostrils and mouth ; at many places it is impossible on calm days to work without a mosquito-net, and that is an awful nuisance. Without mosquitoes the Arctic summer would be nearly a paradise.

We will now mention a few of the places where excavations have been made, and see what results have been obtained.

The key to the archaeology of Greenland was the great find from Naujan in Repulse Bay, north of Hudson Bay in the Canadian Arctic. This village was excavated in 1922, on the fifth Thule expedition.

At the south end of a small lake, 40–60 feet above the sea, twenty ruined houses were located. The situation was such that it suggested the land had risen about 30 feet since these houses were built. The houses were half underground, round, small, about ten feet in diameter ; the walls were built of stones, turf and big whale skulls ; the roof had been supported with whale ribs and jaw bones ; the entrance to the house was through a deep, narrow, stone-set passage.

About 3000 specimens were found at Naujan, mostly from a big, three-foot thick refuse-heap, found in front of three of the houses. In the frozen earth of this midden the specimens had been very well preserved. A few blades of native copper and a bit of meteoric iron was found and most of the objects were of bone—whale bone, antler, walrus and narwhal ivory—and stone—slate, flint, jade, soapstone. Very prominent amongst the finds was baleen, shaped to all kinds of implements ; whaling had evidently played a great part in the economy of the Naujan Eskimos. Among the specimens must be mentioned harpoon heads, mostly of a special form, with open shaft socket ; arrow heads of antler with conical tang ; balls of bird bolas ; sledge shoes of whale bone and baleen ; bows of baleen ; knives with bone handles and stone blades ; drills ; adzes ; women's knives ; lamps (with a row of knobs near the front edge) and cooking pots of soapstone ; fragments of pottery vessels ; baleen cups and bowls ; many ornamental trinkets of ivory, dolls and other toys.

The culture of this Naujan find is quite different from the culture of the recent inhabitants of this region, the central Eskimos ; these people only use snow houses and are rather caribou hunters than seal hunters. When one asks these Eskimos about the old ruins they say

that they belonged to the Tunit, a foreign people who left the country and went to the north, when they themselves reached the coast from inland. These Tunit people were small but strong; the men had bearskin trousers and the women very long boots.

This old culture in the Canadian Arctic, represented by the Naujan find, has been called the Thule culture. There is much evidence to show that this culture in a distant past originated in the neighbourhood of Bering Strait, in eastern Siberia, or in north Alaska, and spread thence to the East, across the American Arctic, where its ruins are found everywhere, both on the mainland and in the Arctic archipelago.

In the northernmost part of the west Greenland coast, in the Cape York district, is situated the trading post of Thule, Knud Rasmussen's station, erected to supply the small Polar Eskimo tribe with European goods. In 1916, close to this place, was found a very old Eskimo midden, containing many antiquities. The culture represented here is the same Thule culture found in the Canadian Arctic; we have the harpoon heads with open socket, the lamp with a wick-ledge and the many baleen objects. These finds show that the Thule Eskimos from the American Arctic also reached Greenland and were the first Eskimo inhabitants of this country.

The recent inhabitants of this region, the Polar Eskimos, have many elements in common with the Thule culture; their men have bearskin trousers and their women long boots, as the 'Tunit' of the Canadian Eskimos. And the house of the Polar Eskimos, a round stone house, is a descendant of the whale-bone house of the Thule culture.

I spent the summer of 1929 on the small island of Inugsuk, together with my young American assistant, Dr Frederica de Laguna. The island is situated ten miles north of Upernivik, the northernmost of the Danish colonies on the west coast, separated from Thule by the large, ice-filled, uninhabited Melville Bay. This small, rocky island is situated in the mouth of Upernivik's ice fiord, one of the most prolific ice-producers derived from the inland ice; the sea around Inugsuk was always filled with enormous icebergs of all sizes and shapes, dangerous neighbours, which in overturning often sent heavy flood-waves against the shore. On the west side of this small island was situated the remains of an old, big Eskimo village; most of it had already been washed away by the subsidence of the land and the action of the sea.

A small strip of low land, about 300 feet long and 100 feet wide, was covered with a thick layer of old refuse, and had a cliff three to six feet high raised over the beach. Here bones, baleen, wooden pieces and implements were scattered. On the top of this midden were three houses, which were inhabited about 1850; but the lower and greater part of the midden was much older. The ground was frozen solid just below the surface, and it took the whole summer to excavate to the bottom; but Inugsuk proved to be the richest finding place for old Eskimo antiquities which I have met in Greenland.

Everything had been well preserved in this enormous frozen midden: bones, bone and baleen implements, heaps of big unworked baleens, wood, pieces of sealskin, feathers, eggshells, dog excrement, human hair; and the whole was saturated with blubber. On calm sunny days this old thawing midden sent forth a most unpleasant odour. It is a common rule in the Arctic that where the smell is worst, the best finds are to be got; and this was the case at Inugsuk.

About 6000 worked specimens were taken from this midden during the summer, and many of them were of great interest. Most of the implements were of types well-known from Naujan, Thule and the other sites of the Thule culture. Some of the harpoon-heads had the same open sockets; we found the same kinds of arrow-heads, bola balls, sledge shoes, knife handles, drills, adzes, women's knives, lamps (with wick ledge), cooking pots, baleen bowls, trinkets and toys. The baleen implements were very prominent: bows, sledge shoes, snow beaters, weapon points, knives, cups, large pieces of platform mats, tops, toys; even a house door, a drying rack and a drum frame of baleen. The Inugsuk people too had been great whalers.

The Inugsuk culture is not identical with the Thule culture; something new had been added, which gives the find a younger stamp: most of the harpoon-heads have a closed socket; some special west Greenland types have appeared, some implements of silicious slate, some ornamental bodkins, some antler spoons and coopered vessels. And some of these new types seem to be influenced by a foreign culture —the culture of the medieval Norsemen who in the five centuries from about 1000 to 1500 existed in south Greenland. These Norsemen were familiar with the coopering technique, and they used spoons of the same shape as those found at Inugsuk. But can these Norsemen really have had any communication with the Inugsuk Eskimos, who lived five to six hundred miles further north?

We found however at Inugsuk more evidence of this connexion:

a lump of church-bell metal, used as a hammer ; a piece of woven cloth, of the same kind as that found in the Norse church-yards in south Greenland ; a bone chessman, converted into a top ; and two wooden carvings, made by Eskimos, but representing Norsemen ; one of them is a small doll, showing a Norseman in medieval dress, with long coat and big, loose hood, the same dress as that which has been found in the Norse church-yard of Herjolfsnes in south Greenland. The Inugsuk people must actually have seen Norsemen. Now fortunately we know that there really were three Norsemen up here in the latter part of the 13th century : for on another island, close to Inugsuk, there was found about a hundred years ago a runic inscribed stone, saying that ' Erling Sigvattsson and Bjarne Tordsson and Enride Oddsson erected this cairn on the Saturday before soccage day '. The language enables us to fix the date.

These Norse relics at Inugsuk are very important. Not only are they important for the elucidation of the connexion between Norsemen and Eskimos ; but it gives us a means of dating approximately the Inugsuk culture : it must belong to the 13th and 14th centuries. The Thule culture then must be some centuries earlier.

We now move into the southernmost part of west Greenland, the Julianehaab district. Here we worked during the summer of 1934, spending about five weeks at the village-site of Iugtutôq, situated at the north point of a large island. The name means ' caribou place ' ; the caribou has however been extinct for a hundred years.

It was an extensive village, with ruins of 24 houses. The oldest of them are now only to be distinguished as shallow depressions in the gravel terrace, covered by heather and lichen ; others have willow bush and the latest are grass-grown.

The climate here is quite different from that we experienced at Inugsuk. It is not so cold, but the weather is more unsettled, both in summer and winter ; frost and thaw alternate even in the winter, and in summer there is much stormy and rainy weather—and any number of mosquitoes ! The excavation was easy—except for floods of melting water in the spring—but the objects were very poorly preserved ; most of the houses only contained stone objects, mostly whetting and hammer stones and soapstone pot-fragments. The houses however were well preserved : the oldest were small, round and half underground, with a deep sunken doorway, stone walls, poorly built, stone paved floor and often a kitchen, forming a bulge in the front wall, where there had been

cooking with bone and blubber. This house-type is no doubt derived from the whale-bone house of the Thule culture ; only stones and drift-wood have replaced whale bone.

The specimens found in the twenty excavated houses of this type were not very numerous ; but they were sufficient to tell us that the Eskimo inhabitants belong to the Inugsuk culture. Very prominent amongst the finds were fragments of soapstone lamps with wick-ledge and objects derived from the Norsemen : pieces of bell-metal and of iron, soapstone, spindle-whorls (one with a runic inscription), a piece of woven cloth, fragments of soapstone vessels, and net-sinkers.

The Julianehaab district in the medieval period was the centre of the Norse colonies in Greenland, the ' East Settlement '. Here the Icelanders settled as sheep and cattle breeders, after Eric the Red had discovered Greenland in 985 ; and here for five centuries there lived a numerous population, with 190 farms, several churches and monasteries. At first the Norse Greenlanders were quite prosperous ; but from the 14th century onwards communication with Iceland and Norway became less regular until it ceased entirely at the beginning of the 15th century ; and when white people again went to Greenland in the 16th century the Norsemen had disappeared, having died out ; only the ruins of their houses told that the land had formerly been peopled by a white race. What had happened ?

The Norsemen first met the Eskimos about 1200, on hunting trips to the northwest coast ; as the Inugsuk find showed, there had been some connexion between Norsemen and Eskimos. The Eskimos only inhabited the west coast as far south as the climate was Arctic, with that winter ice which was necessary for their ice hunting and dog sledges. But in the 14th century the Eskimos began to move southward. About 1350 they attacked and destroyed the Norse ' Western Settlement ' ; and in 1379 we hear about the first attack on the ' Eastern Settlement '. And now the Norse colonization began quickly to decline.

The Norsemen were then already a degenerate race, as Dr Poul Nörlund's excavations in the church-yard at Herjolfsnes has shown : they were sick, under-nourished, degenerate and weak. The Norsemen of course looked with contempt on the Eskimos, these small, black heathen ; and they probably killed them whenever they met. But the Eskimos had a fighting method of their own : they attacked the Norsemen individually and from behind with their very effective weapons, bows and slings ; or they burned the Norse houses, after

having blocked up the doors. The tales of the Greenlanders relate how the last chief of the Norsemen, Ungortoq, fled out of his burning house with his little son in his arms, and then, when the Eskimos pursued him, threw the boy into a lake so that he should not be taken alive.

The Norse colonies disappeared and the Eskimos plundered the habitations, which explains how they got all those Norse objects which we now find in the old Eskimo ruins. The Norsemen certainly did not break their church bells voluntarily so that the Eskimos might make hammers or ear-drops out of the fragments.

Half-way up the fiords we now find the ruins of these, the oldest Eskimo villages ; there they could still do some hunting from the ice in the winter, as they were accustomed to from their northern home. But later they scattered all over the country, and also onto the outer skerries ; their kayak technique was now sufficiently developed to stand the south Greenland winter.

The later houses at Tugtutôq belong to this period, the 17th and 18th centuries. The houses are now big, square communal dwellings for several families, each containing 30–50 persons. The walls were of stones and turf, the floor paved with flat stones, the platform and roof of drift-wood. It was the kind of house still used when the Danish colonization of Greenland began with Hans Egede in 1721, and which is still used in Angmagssalik on the east coast. These house-ruins contain Eskimo implements of more modern type and also glass beads, clay pipes and iron goods, brought to Greenland by the Dutch Whalers.

The Eskimo immigrants to the Julianehaab district soon passed on south through the region of Cape Farewell, to the east coast. The oldest house-ruins at Angmagssalik are of exactly the same form and contain exactly the same type of implements as the oldest houses at Tugtutôq ; already early in the 15th century the Eskimos had reached Angmagssalik. They did not however stop here, but wandered still farther north. The oldest houses in northeast Greenland also contain Inugsuk culture. But soon this culture was intermingled with other elements, brought by some Eskimos who from the Thule district wandered on northwards and reached northeast Greenland, where they lived for centuries, but only once did white people see them : Clavering met a small party of them on Clavering Island in 1823. Since then they have all become extinct.

In Angmagssalik there is however still a prosperous Eskimo population ; since 1894 a Danish trading post has been situated there. A curious and in some respects old fashioned (but in others, highly-developed), culture was found amongst these Angmagssalikers, when the first white man, Gustav Holm, visited and spent a winter amongst them in 1884. In 1925 a hundred of them were transplanted to the newly founded colony on Scoresby Sound. East Greenland now has a population of about 1000 Greenlanders, while the west coast has about 15000, and the Thule district 300.

Civilization has now come to the Greenlanders. In South Greenland fishing has more and more displaced seal-hunting ; the yawl and motor-boat have succeeded the kayak and woman's boat ; the rubber-boot the kamik shin-boot ; the gun the harpoon and the wooden house the old turf hut. The old Eskimo culture in Greenland will soon exist only in the old house-ruins and graves, and in the museums.

Prehistoric Antiquities of Malta*

by David Randall-MacIver

THERE was certainly room for a well illustrated work, providing at once a conspectus and a review of early Maltese archaeology. Only an unusual library can supply simultaneously to the reader the *Papers of the British School at Rome*, three or four volumes of *Archaeologia*, the official reports on the excavations, Ebert's *Real-lexikon*, and Zammit's *Prehistoric Malta*, to mention only the indispensable minimum. Even with all these the student has not enough pictorial material to enable him to visualize the whole subject.

Signor Ugolini is therefore doing a very useful thing when he undertakes to publish in six volumes of no excessive bulk an illustrated record of the monuments, sculptures and other objects of interest. He certainly possesses the first qualification for this task, as his photographs are excellent, and the line drawings and plans are up to the best standard. The author's efforts have been well seconded by the publishers, who bring out his work in handsome form with large clear print and admirable reproductions.

The volume before us is written in popular style, obviously with the hope of attracting a large public. It is not unnatural that in these circumstances the author sometimes writes to please the gallery. This is fairly harmless and does not work much damage. The book is intended at once as a preface and a general introduction to volume 1, ' The Neolithic Temples of Tarxien ' ; vol. 2, ' The larger Neolithic temples and the Hypogeum ' ; vol. 3, ' Minor Neolithic temples and Megalithic Monuments ' ; vol. 4, ' Temples, cemeteries and materials of the Cuprolithic age ' ; vol. 5, ' Conclusions '.

I have thought it convenient to translate the Italian titles, and to avoid later explanations may say at once that in this article I shall replace ' Cuprolithic ' throughout by ' Chalcolithic ', the word generally

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* *Malta : origini della civiltà Mediterranea.* By Luigi M. Ugolini. Pp. xvi, 314, 12 plates and 114 text-figures. Rome : Libreria dello Stato, 1934. 100 *lire.*

used by English writers. It is a better term, when ' Chalkos ' is understood, as it should be, to include copper as well as bronze. Either word is preferable to the barbarous ' eneolitico ' which has dominated Italian archaeology for two generations. The mulatto offspring of two classical languages, ' eneolitico ' is also an execrable pun which has at last become intolerable. It is to be wished that French and German writers would now come into line by substituting ' Chalcolithic ' for ' Age du cuivre ' and ' Kupferzeit ', which do not nearly so well express the characteristics of that phase in which the latest neolithic products coincide with the earliest appearance of copper.

The scheme of the book is, very briefly, as follows :

The first 20 pages are introductory, dealing in short summary paragraphs with the geography, geology, palaeontology, and anthropology of the island. Chapter 1 then enumerates the several types of monumental remains : caverns, tombs, temples, and introduces us to the stone sculptures, terra-cotta figures, animal-reliefs and pottery. A ' stylistic review ' of these is made in chapter 2, which ends the first or expository section, written with a clear directness of style which is both practical and attractive.

In the next part chapter 3 brings up the great question on which the main interest of Maltese archaeology depends. Are the earliest temples Neolithic or not ? and, if perhaps rightly classified as Neolithic on technical grounds, are they yet really retarded survivals chronologically to be equated with the Bronze Age in the other parts of the Mediterranean ?

Chapters 4, 5, 6 of part 2, entitled ' Religion ', ' Civilization', ' Peoples ', contain some interesting speculations. The arguments in favour of considering the larger buildings to be temples rather than palaces are well mustered. Close observation and much originality of suggestion mark the account of the architecture.

Part 3 is principally devoted to an enquiry as to how much the other Mediterranean countries and islands can offer for comparison with Malta. If the results of the enquiry are largely negative yet some interesting evidence is obtained, especially from the comparison with Sardinia and with Spain.

Part 4 is far inferior to the rest of the work. It is entitled ' Conclusions ', but as the real conclusions had been given already this section is mostly padding and irrelevance. Perhaps some extra pages had to be written in order to space out the numerous illustrations. But they might have been better used. Here for instance the writer

might have found space to repair an omission which must be very patent to English readers, by giving some credit to those who have worked in Malta before him. The names of Thomas Ashby and Eric Peet do not appear anywhere at all in the text. Nor is there the slightest hint of the importance and value of Sir Themistocles Zammit's work in excavation. It may be hoped that this oversight will be rectified in the later volumes.

The questions raised in parts 2 and 3 are of vital interest to Archaeology. First and foremost is the problem of chronology, which our author tackles very courageously and, in my judgment at least, quite successfully. His argument is based principally upon a section obtained in Zammit's digging of Tarxien. From the pavement of the temple up there was a uniform layer of light-coloured earth, 90 centimetres deep, in which lay numerous objects, some certainly *in situ*, others lying confusedly. These objects included statuettes of limestone, flint implements, horns of animals, pottery models of buildings, pottery vessels. Above this was a stratum clearly to be distinguished by its black colour, carbonaceous and evidently produced by burning. This upper stratum was 30 centimetres deep and contained human bones, being in fact a small burying ground. With the human bones were objects of personal adornment, copper weapons and pottery. A photograph and a sketch illustrate the section. Now the upper stratum, our author maintains, is not as usually stated merely ' Bronze Age ', it is definitely and precisely *Chalcolithic*. In this he is unquestionably right, the types of the daggers and axes prove it beyond all doubt. The lower section he maintains to be Neolithic, which is the usual view. As the buildings of the temple must be older than this lower stratum of objects the buildings, it is argued, must be Neolithic.

Some students, while not questioning the Neolithic type of the Maltese culture and the earliest temples, have maintained that they are retarded survivals, chronologically to be equated not with the Neolithic but with the Bronze Age in more progressive parts of the Mediterranean. Ugolini vigorously combats this view, which certainly seems to be arbitrary and to offer too facile an explanation. The only real attack that might be made on his position is different. Accepting the chronological equation of Malta with other countries, and discarding the suggestion of retardation, it might be argued that both strata are Chalcolithic, and that the interval between the abandonment of the temple and its filling up by the lower stratum of earth was so short that the temple itself might not antedate the Chalcolithic.

This would be logical but it looks like forcing the evidence. The natural course for an unprejudiced critic is to accept the argument of this book and fearlessly to face the consequences.

The consequences are serious, but need not be portentous. Ugolini makes the most of them, and falls sometimes into obvious exaggerations. Yet he is certainly entitled to much credit for his fearlessness, and for the emphasis that he lays upon the importance of this orientation of the facts. Malta exhibits the earliest civilization, after the Palaeolithic, known in the Mediterranean ; and it is a civilization of a surprisingly high order. Is this incredible ? We have no right to say so.

The difficulty is that there is so little extant of true Neolithic age which can serve as a basis of comparison. It has frequently been remarked in late years by such writers as Antonielli, Rellini, von Duhn, that the evidence for true Neolithic in Italy is fast evaporating. The latest witness is Rellini's book on *La più antica ceramica dipinta in Italia*, which proves the painted pottery of the Vibrata and the Materano to be not Neolithic but Chalcolithic. Site after site once classed as Neolithic proves on examination to belong to the next stage.

There certainly remain in Italy and Sicily, if hardly anywhere else, a few purely Neolithic sites ; but the yield from them is so slight as to afford no evidence of the general standard attained by their inhabitants. In Crete the Neolithic stratum still awaits exploration. In short there exists no criterion by which we can judge what the Neolithic civilization was really like in any part of the Mediterranean littoral or the islands in that sea.

But it is surely reasonable to believe that it was of a very high order, and I see no cause for thinking that it may not have been as high as that which is claimed for Malta. The brilliant Chalcolithic civilizations of Egypt, Crete and the nearer Orient cannot have been suddenly evolved. When we have found the preceding stage in these countries shall we be surprised if it proves to be fully as sophisticated as anything illustrated in this book ?

But though I may be willing to believe in the Neolithic dating of the earliest Maltese temples, and may not be afraid to accept this interesting architecture and elaborate ornament, these characterized statues, and remarkably perfected pottery, as truly Neolithic in date and style, I cannot accept the unnecessary corollary which Ugolini draws.

For him Malta is not only the earliest seat of any civilization yet known after the Palaeolithic, but it is also the source of many features in

the principal civilizations of the Mediterranean. This is not only implied in the title of his book, it is explicitly stated in chapter 7 and most emphatically repeated in the ' Conclusions '. It is needless to say that there is no real evidence for such a fantastic contention, but I may point out that what little we know is directly opposed to it. Nothing for instance could be more striking than the total absence of any trace of Maltese influence in Italy and Sicily, though they are geographically so near. Apulia may always have some surprises in store, but as yet Molfetta and Matera have produced nothing even faintly suggestive of Malta. In the eastern Mediterranean even Ugolini himself does not venture to suggest that Egypt borrowed from Malta. And though he claims that some pottery from the Neolithic stratum in Crete is identical with Maltese examples this scarcely helps his case. Crete was never exactly wanting in originality and may have produced its own pottery without assistance. The most that might be conceded in this regard is that Malta may possibly have preserved certain traits once widely prevalent, of which the examples in Aegean regions are still underground.

But when we turn to the western half of the Mediterranean the case is very different. This may well have been the sphere of Maltese influence ; it certainly defines the circle within which that culture was evolved. There is an immediate and unmistakable link in the megalithic style of building which runs through all the islands and is found in Spain. It is true that none of these megalithic structures is known to date back to the Neolithic period, but they all have a certain generic affinity, and some of them retain in the Chalcolithic or even the Bronze Age such marked peculiarities of Maltese architecture as the semicircular exedra ; striking examples of this are figured from a ' Giant's tomb ' in Sardinia and from a building on the Spanish site of Los Millares.

What may have been the character of any Neolithic civilization in North Africa we cannot even guess ; but I strongly sympathize with the suggestion that Tunis or Tripoli may some day help to explain the Maltese problem. In the meanwhile Ugolini's work serves as an admirable *mise-au-point*, beyond which it is impossible to go until more excavations have been made in many places besides Malta.

Notes and News

AN ASSYRIAN CAMP-SCENE (PLATE I, p. 216)

The Editor having asked me to write a few lines in explanation of the subject of PLATE I I gladly comply, though there can be little novelty in my remarks. This fragment of an Assyrian sculptured slab is now in the Vorderasiatische Abteilung of the National Museums in Berlin, numbered VA 965, and exhibited in the recently-opened room 15. It has been several times published and described, last by D. Opitz in the *Archiv für Orientforschung* VII, tafel III, and p. 11f. The Berlin Museum acquired it indirectly, for it was at one time in the Crystal Palace at Sydenham, but its provenance is known to be the mound of Kuyunjik (Nineveh), opposite to the modern town of Mosul on the Tigris. There it was discovered by the excavators who were working on behalf of the British Museum in 1853 and 1854 among the ruins of the North Palace, built by Ashurbanipal, the last great king of Assyria, who reigned from B.C. 668 till about 630.

In its present form the fragment preserves only part of one out of (probably) three registers which filled the complete height of the slab, and that remaining is most likely the uppermost, for the perimeter-wall of the camp, seen at the top, begins to curve downwards at the left, and the complete circuit would evidently occupy much room below the existing register. It is a reasonable assumption, therefore, that the whole slab was occupied with camp-scenes similar to those preserved, and, since the personal affairs of the king were invariably the subject of these sculptures, we might go further and suppose that the royal tent itself was shown, in the middle register now missing.

It will be seen that the moment chosen by the artist for depiction is that of the return of the army to camp after a battle, also that the quarters shown are evidently those of the high officers, which gives a further point to the suggestion above that the king's tent was pitched not far away. The returning warrior is greeted by a batman with refreshment (which he snatches greedily), another makes his bed, and in a neighbouring service-tent a sheep is being quartered for his meal. The two utensils hanging on the branch pole of the tent are not easy

to identify—perhaps one of them is a fan to cool the master while he rests.

Outside lie sheep and a goat, also a pair of camels, or rather dromedaries, with their fodder before them, which has been brought by a man seen with his hand in a sack—though this detail has also been explained as showing a baker preparing his flat cakes by plastering them on the side of an oven. The camels neglect their meal, being occupied in courting. They have, however, an interest here beyond that of illustrating a commonplace detail of animal behaviour, for it is their presence which has caused some to believe that this scene comes from a series of pictures of Ashurbanipal's campaign against the Arabs. It is known that one room in the North Palace was lined with sculptures depicting the rout of the Arabs and the burning of their encampment, and it is assumed that this fragment belonged to the same series. But there is really nothing beyond the mere presence of the dromedaries, the Arabian camels, to suggest this, and such animals were widely used at that period in many territories over which the Assyrian kings campaigned.

There is no sufficient reason, then, for us to pitch this camp in any particular locality, though no doubt at one time the place would have been clearly indicated by an inscription upon a neighbouring slab ; but this guidance is now lost. C. J. GADD.

FLINT ARROW-HEADS FROM THE GRAVE OF MES-KALAM-DUG, UR*

The complexity and richness of the civilization revealed by the excavations at Ur, and the beauty and intrinsic value of many of the objects found, are such that the flint arrow-heads from the grave of Mes-kalam-dug, illustrated by FIG. 1, may hardly appear worthy of attention. Yet it is true that in archaeology common things are normally of more fundamental interest than rare ones—' common things ' wrote General Pitt-Rivers ' are of more importance than particular things, because they are more prevalent '.[1] This dictum of the General's must have been unpopular at the time he made it, when most collections were being formed on directly opposite lines by the assemblage of those rarities which now alternately bore or intimidate

* Thanks are due to Dr Woolley and the British Museum authorities for permission to publish this description and for facilities in having tracings made.—EDITOR.

[1] General Pitt-Rivers, *Excavations in Cranborne Chase*, vol. IV, 1898, p. 27.

the public ; but at the present day we should all be agreed that the General never made a sounder or truer statement.

The arrow-heads from Ur, to which we may now draw attention, were found ' all in a cluster, point—or rather cutting edges—upwards and 0.30 m. above the floor of the pit ; they had evidently been in a quiver, which had perished, and judging from their position the shafts to which they were attached had been 0.30 m. long '.[2] If the arrow-shafts were really only 30 cms. (*i.e.* about one foot) long they could have been of little real use. Sir John Evans had in his collection a number of complete arrows of this kind from Egypt, and these measured on the average 35 inches in length.[3]

The three flints illustrated belong to a class found widespread over North Africa and Western Europe. Though varying in detail, the various forms are fundamentally the same ; they consist of sections of flint flakes with two sides blunted abruptly by steep flaking in the

FIG. 1. CHISEL-ENDED TRANSVERSE OR *TRANCHET* ARROW-HEADS OF FLINT, FROM THE GRAVE OF MES-KALAM-DUG AT UR (½)

microlithic manner ; the two edges, which formed parts of the edges of the original primary flake, are left untouched, one to act as the business edge of the chisel-ended arrow, the other for insertion into the shaft. The chief possible variations in form are summarized below:—

1. The width of the edge may be several times smaller than the width of the primary flake from which it was taken (*e.g.* FIG. 2, no. 11), or may on the other hand be approximately equal (*e.g.* FIG. 2, no. 4), or as much as twice as big (*e.g.*, FIG. 2, nos. 18, 19).
2. The angle of the business edge, which is normally approximately at right-angles to a line bisecting the angle formed by the blunted sides, may occasionally be oblique (*e.g.*, FIG. 2, nos. 7, 16, 17).
3. The degree of the angle formed by a prolongation of the blunted sides, varies greatly according as these edges are almost parallel to one another or taper to a narrow tang.
4. The degree of concavity of the blunted sides, is sometimes nil (*e.g.*, FIG. 2, nos. 9, 15, 22) and in other cases quite marked (*e.g.*, FIG. 1, nos. 1–3 ; FIG. 2, nos. 6, 8, 18, 19).

[2] C. L. Woolley, *Ur Excavations, vol.* II, *The Royal Cemetery*, p. 160.

[3] Sir John Evans, *Ancient Stone Implements of Great Britain*, 2nd ed., p. 369.

The specimens from the grave of Mes-kalam-dug are of closely similar form, showing sides strongly tapering and markedly concave, features which give them well-defined tangs. It is possible that this variant had become stereotyped in Mesopotamia at that date.

There is no direct evidence to suggest the exact method of hafting Mes-kalam-dug's arrow-heads, but this can be inferred fairly certainly from the evidence of finds made elsewhere in which the shaft, or part of it, has survived. Several such finds have been made in northern Europe. We illustrate (FIG. 2, no. 1) a specimen found at a depth of between $2\frac{1}{2}$ and 3 metres in a peat bog at Tvaermose, Eising Sogn, Ginding Herred, North Jutland,[4] and another (FIG. 2, no. 2) from Petersfehner Moor, Oldenburg[5]; in both cases the foreshaft is of wood[6] and the flint is secured by animal sinews. In the case of the specimen from a peat bog at Vissenberg, Odense, Fünen, engraved by Madsen and reproduced by Evans,[7] the shaft was also of wood, but the binding was of 'fine bast-fibre'.[8] Another group of specimens with hafts intact comes from Egypt. The example illustrated (FIG. 2, no. 3), belongs to the period of the Middle Empire,[9] and in common with other Egyptian specimens is secured in its haft by bitumen.[10] The shafts of the Egyptian arrows generally consisted of reed and the foreshaft of wood. The shaft was notched at one end for the string of the bow and in some cases at least there are definite indications of feathers at either side to steady the flight of the arrow (Evans, *op. cit*, p. 369). It seems probable that the specimens from Ur were hafted in the same way.

In Northern Europe the *tranchet* arrow-head is found abundantly at sites dating from the latter half of the Mesolithic period. It is absent from the Early Tardenoisian, uncommon in the Middle Tardenoisian, but extremely abundant in the Late Tardenoisian. It is also absent, or virtually so, from sites of the axe-cultures of Northern Europe of the Boreal period, becomes fairly common in the Oldesloe

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[4] Sophus Müller, 'Archaeologisk Udbytte af Mosearbeidet i Krigsaaret 1917', *Aarbøger*, 1917, p. 149, fig. 1.

[5] Gustav Kossinna, *Die Indogermanen*, 1921, p. 29, fig. 40.

[6] As the total length of arrow surviving is only $4\frac{1}{2}$ inches, it is not possible to say whether the shaft was a simple wooden one, or whether it consisted of shaft and foreshaft.

[7] Evans, *op. cit.*, p. 409, fig. 344.

[8] Another Danish specimen is in the British Museum. See *Stone Age Guide*, 3rd ed., fig. 181. Material of binding not indicated.

[9] J. de Morgan, *Prehistoric Man*, fig. 41, no. 6 and p. 97. [10] See Evans, p. 369.

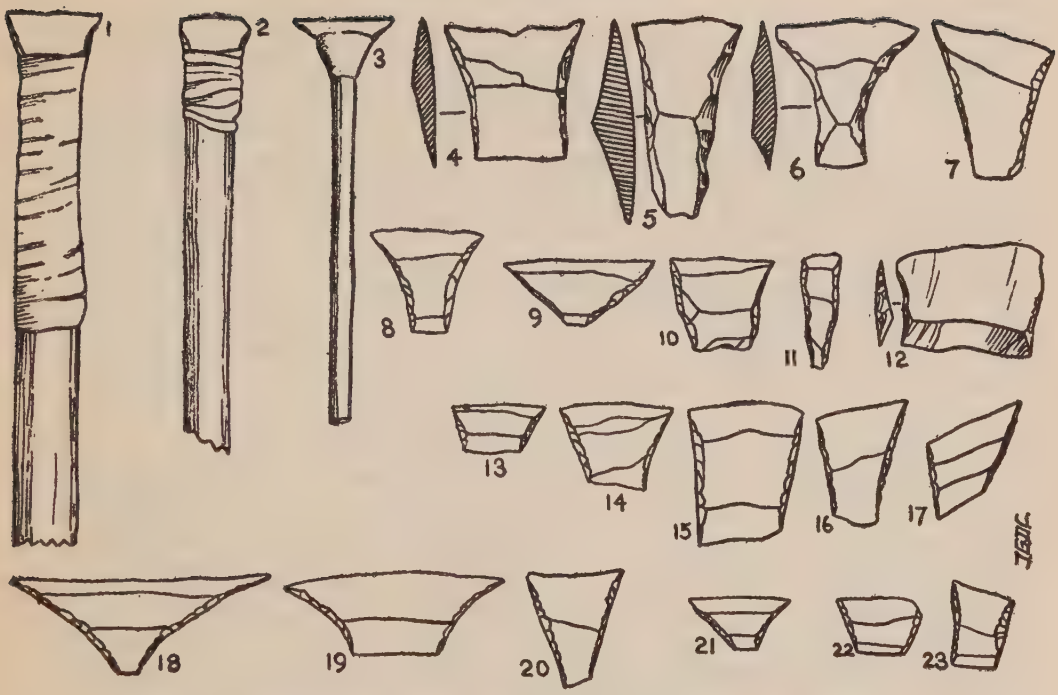

FIG. 2. CHISEL-ENDED TRANSVERSE OR *TRANCHET* ARROW-HEADS OF FLINT, ALL EXCEPT No. 3 FROM THE MESOLITHIC PERIOD

Natural size except no. 2 at $\frac{2}{3}$; nos. 9–11 at $\frac{17}{20}$; nos. 13–17 at $\frac{7}{10}$; no. 20 at $\frac{1}{2}$; no. 21 at $\frac{2}{3}$

1. Tvaermose, Eising Sogn, Ginding Herred, North Jutland. After Sophus Müller, *op. cit.*
2. Petersfehner Moor, Oldenburg. After Kossinna, *op. cit.*
3. Middle Empire, Egypt. After de Morgan. *op. cit.*
4–7. Kitchen-midden of Ertebølle, N. Jutland. Drawn by author in Copenhagen Museum.
8. Svaerdborg, Zealand. (See note 25). Drawn by author in Copenhagen Museum.
9–11. Under sand-dunes at Wangford, Suffolk. Drawn by author in the University Museum of Archaeology and Ethnology, Cambridge.
12. From floor of a Later Tardenoisian pit-dwelling at Selmeston, Sussex. Excavated and drawn by the author. See *Antiquaries Journ.*, 1934, XIV, 134 ff. Lewes Museum.
13–17. From the upper Tardenoisian level at Zonhoven, Belgium. After Hamal-Nandrin and Servais.
18, 19. From the Later Middle Capsian midden of Aïn Mouhâad, Algeria. After Menghin.
20. From a Later Capsian site in Algeria. After Menghin.
21. From the middens at Mugem, Portugal. After Obermaier.
22, 23. From the Later Tardenoisian site of Slochy Ogrodinki, Poland. After Szmit.

and Gudenaa river cultures, and extremely abundant to the exclusion of other microlithic forms in the kitchen-middens of Denmark. A series extending from Spain to Poland is illustrated by FIG. 2.

The type continued in use and is found commonly in megalithic tombs in Iberia, Brittany, Holland, North Germany and Denmark; it also occurs rarely in the British Windmill Hill culture, *e.g.*, at Whitehawk Camp, Brighton, and at Windmill Hill,[11] and continues into the Bronze Age.[12] It seems also to have given rise to a large number of derivative forms, which are found commonly in Britain from the Neolithic period and on into the Bronze Age.[13] These derived forms have not been well studied elsewhere, though isolated specimens of derived forms have been illustrated from France. A similar development from a transversely to an obliquely hafted form was observed by Siret[14] in Grenada and Almeria, and supported by Breuil.[15]

In North Africa the material is not sufficiently well-dated geologically to make time-comparisons with Northern Europe, but the *tranchet* arrow-head (or microlithic trapeze—the same thing) is found extremely abundantly in the Getulian province of the Capsian culture (Eastern Algeria and Tunis), according to Menghin[16] in the later half of the middle or younger Capsian and in the final stages of the Capsian. In Egypt it occurs in the first pre-dynastic,[17] and in Upper and Middle Egypt survived the foreign influences of the second predynastic period,[18] and became a stereotyped feature of equipment for shooting birds and small game[19] The hieroglyphic sign, in fact, for an arrow was based

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[11] J. G. D. Clark, 'Derivative forms of the petit tranchet in Britain'. *Arch. Journ.*, 1934, XCI, p. 38, and fig. 3, nos. 1 and 2. [12] *Ibid.* fig. 3, nos. 3 and 3a.

[13] *Ibid.* p. 55. [14] See *Bull. Soc. d'Anthr. de Brux.*, 1924, p. 220 and fig. 6.

[15] H. Breuil, 'Les Subdivisions du Paléolithique supérieur et leur signification'. *Congr. Int. d'Anthr. et d'Arch. Préh., Geneva*, 1912, p. 237, fig. 47.

[16] O. Menghin, 'Die mesolithische Kulturentwicklung in Europa'. *Deutsches Arch. Inst. Rom.-Germ. Komm. Ber.* 1927, pp. 162–6.

[17] V. G. Childe, *The Most Ancient East*, p. 77. [18] *Ibid.* pp. 80–1.

[19] Possibly it was also used as a weapon by inferior peoples. Evans, *op. cit*, p. 369, quotes the case of two sets of wooden figures in Ghizeh Museum from a 6th dynasty tomb at Assiut, showing on the one hand Egyptian troops with brown complexions and armed with bronze spears and shields, and on the other shorter black-faced troops 'armed with bow and arrows only; each (with) a bow in his left hand, and in his right four arrows with chisel-shaped heads of flint'.

Possibly the fact that the type is a very ancient one caused it to be used for symbolical purposes in burials. Is this why such arrows occurred only in the grave of Mes-kalam-dug, and not in the other graves examined in the Royal Cemetery at Ur?

on the chisel-ended form.[20] Various elaborations of the form were perfected in Egypt, *e.g.*, the remarkable specimens obtained by Petrie from Abydos (contemporary with the 1st dynasty),[21] as well as such devices as hafting three heads on one shaft, or two smaller ones on either side of and slightly below a larger central specimen.[22] It is clear in fact that in Egypt and in North Africa generally the type has had a very prolonged history, stretching away back to the later stages of the Capsian.

There is less published evidence from Mesopotamia, but the type seems to have occurred in the first prediluvian stratum at al-'Ubaid.[23] At Ur it was confined to the grave of Mes-kalam-dug.

The suggestion made by Dr Woolley that the *tranchet* arrow-head is possibly ' one more example of Egyptian borrowing from Sumer prior to the rise of the first dynasty ' rests on the false premise that the type ' has not been found [in Egypt] in predynastic associations '.[24] In actual fact, as we have shown, it is extremely ancient in North Africa. In the present state of knowledge it would be rash to decide which of the two areas can claim priority, but North Africa must hold the field on existing evidence. As between North Africa and Northern Europe it is hardly possible to say very much ; the type is certainly 6000 and possibly 7000 years old in Denmark,[25] but until more is known of the late quaternary geology of North Africa it seems impossible to date the various stages of Capsian culture with any degree of accuracy. It is certainly significant that the *tranchet* arrow-head seems to have arrived abruptly about the middle of the Mesolithic in Europe, and this has led some writers to suggest that it marks the arrival in Europe of some impulse from North Africa.[26]

J. G. D. Clark

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[20] V. G. Childe, *op. cit.* p. 96. [21] See de Morgan, *op. cit.* fig. 41, nos. 4 and 5.

[22] *Ibid.* fig. 41, no. 8. [23] C. L. Woolley, *op. cit.* pp. 380–1. [24] *Ibid.*

[25] Out of considerably more than 1000 microliths from the Svaerdborg site, complete enough for certain classification, the only trapeze or *petit tranchet* arrow-head is that illustrated. It is important to note that this was one of the few pieces not found in systematic excavation, and its association is therefore suspect. This type is entirely absent from other sites of the culture period, *e.g.* Mullerup, Holmegaard, Duvensee, Broxbourne, Thatcham. It is therefore unlikely to ante-date the Boreal-Atlantic transition.

[26] *e.g.* Obermaier, *Fossil Man in Spain*, p. 326.

CRETE AND EGYPT.

We have been asked by Sir Arthur Evans to give publicity to a footnote in the 4th volume of his *Palace of Minos*, in which he refers to Dr Reisner's *Mycerinus* (Harvard University Press, 1931) pp. 130 ff, and to his (Dr Reisner's) article in ANTIQUITY V, 1931, 200 ff, on Stone Vessels found in Crete and Babylonia. We quote from a proof-copy of p. 983 of Sir Arthur Evans' book, corrected in his own handwriting:—

. . . . 'As regards proto-dynastic Egypt, I am glad to find that his results correspond generally with those set forth in this Work. It is the more to be regretted, therefore, that, as regards the prehistoric section (in which "Dynasty O", as representing its most developed aspect, should be naturally included) not only is there a serious lacuna—the entire omission of the class of "cupped blocks"—but a clear misstatement of fact. In *Mycerinus*, p. 133, regarding the bases of the Middle and Late Prehistoric stone bowls it is stated that all the examples are of the round-bottomed "type". But the flat base constantly occurs (*e.g. Naqada*, PL. VIII, 1). The flat base with a moulded edge is found both on the smaller class of bowls (*Naqada*, fig. 942 d) and on miniature examples. Such moulded bases are, indeed, a feature of Middle and Late Prehistoric stone vessels in Egypt and disappear in Dynasty I. No proto-dynastic bowls of this kind exist. It was therefore reasonable to claim as an import from predynastic Egypt the lower part of a porphyry bowl with a moulded base of an unusual character found in the pre-palatial dumping-ground northwest of the Palace at Knossos (*P. of M.* II, part 1, p. 59, and cf. p. 31). A small marble bowl (fig. 942 c.) from Naqada (Ashmolean Museum) shows a similar moulding. The same kind of porphyry, with somewhat elongated quartz crystals, occurs among prehistoric vases of the Petrie Collection in the University College Museum (40–60 sequence dating), as was kindly pointed out to me by Dr M. A. Murray.

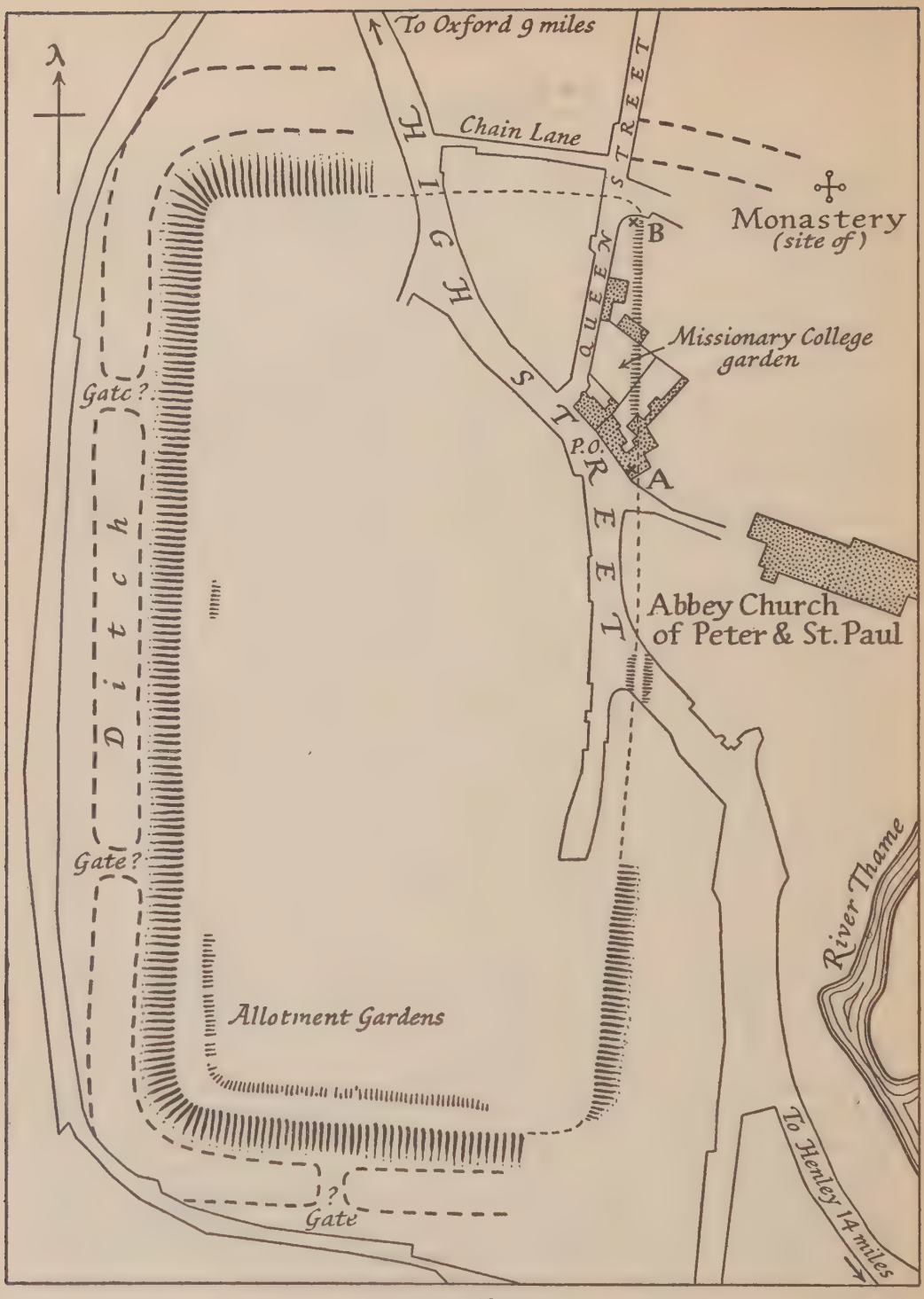
'As explained above, the general indebtedness of Early Minoan forms to predynastic Egyptian models depends on a whole group of parallel objects found in the same early deposits—not only copies of stone vases, but stone palettes, similar idols, as well as features in costume (including a "sheath" akin to the Libyan) fashions of hair-dressing, and apparently the beehive form of their dwellings. All this is brushed aside by Dr Reisner (ANTIQUITY, *loc. cit.*, p. 206) with the aphorism that among primitive races "similar needs and materials are apt to produce objects of similar appearance". The fact is of course undoubted, but it is wholly inapplicable to the present case, relating to

geographically and historically connected areas. The conclusion that under such conditions whole groups of parallel forms of marked individuality were independently evolved without any connexion with one another violates every law of probability '.

RAMPARTS OF DORCHESTER, Oxfordshire (PLAN)

The *History of Dorchester*, edited in 1882 by J. H. Parker, contains a letter written to the editor by the Rev. Thomas Barns, in which—among other things—he described a ' vallum and fosse ' surrounding the modern village. His account is a mixture of field-observation and mere theorizing which it is difficult to disentangle ; it seemed, however, that he certainly had seen something and that his account should be tested. The authors, therefore, assisted by G. H. Askew, A. H. A. Hogg, and the Rev. Adam Fox, visited the site and endeavoured to work out the line of the enceinte. For nearly three-quarters of the circuit, it was remarkably plain to the eye. There was a bank much-denuded but standing in places quite six feet high, with slight but evident remains of a ditch in front of it : inside, the ground had risen usually to the level of the top of the bank, but even in the intensively-cultivated allotments on the south side a perceptible rise of ground marked the back of the bank. And once the line was laid down, it seemed even possible to recognize the points at which it crossed the main Henley-Oxford road, though this road has been recently relaid. At two points in the west and one in the south side, interruptions of the ditch were visible on the ground and may possibly represent the position of gates.

Only in the northeast sector was the rampart difficult to trace. It was noted, however, that its line was taken up by two settlement cracks (A and B on plan) ; these were serious cracks, one in a brick house and one in a modern well-built stone wall. The houses in Dorchester are not noticeably liable to settlement cracks ; it seemed, therefore, that these cracks were significant and were probably to be explained by supposing that at these points the buildings had been insecurely founded on the heel of the bank. Furthermore in the gardens of the Post Office and the Missionary College a ridge was visible which aligns with the bank where it is last observable and with the settlement cracks. This ridge, then, should represent the back of the bank. No traces of a ditch could be seen along the east side and there were no settlement cracks in houses which would straddle its supposed line. Possibly it had



Scale of Yards

50 0 50 100

A and B are Settlement Cracks

RAMPARTS OF DORCHESTER, OXFORDSHIRE

been filled up deliberately when the Abbey and the Castle of Dorchester were constructed immediately outside it ; an open ditch would certainly have interfered with their amenities ; possibly there never was a ditch along this side ; there was some evidence that both north and south ditches ran on beyond the line of the east rampart to join the Thame.

The area enclosed is approximately a rectangle, 375 yards long and 175 yards broad, and containing about 13½ acres. Such a rampart laid out in straight lines around a town that is known to be Roman is in all probability Roman itself ; in any event, it can hardly be later than the building of Dorchester Abbey (1140), if we are right in supposing that the abbey is outside it. In fact, it looks as if Dorchester could be added to the list of small Romano-British towns with regularly planned ramparts, of which the neighbouring Alchester (*Ant. Journ.*, 1927, VII, 157) is a conspicuous example : and since Major Allen's photographs have shown that around Dorchester were numerous village-settlements of a large native population, it is interesting to record the ramparts of a town which was, in all probability, their administrative centre.

The Oxford University Archaeological Society is cutting a section across the ditch on the west side, and it is hoped in due course to publish a detailed account of the field-work and the excavations.

C. E. STEVENS ; G. S. KEENEY.

MEGALITHS IN KENYA (PLATE II, p. 216)

Beyond the not very certain example of Tobolwa, and one other unknown and now unverifiable site, there are no megaliths in Nandi or Vasin Gishu. Of this I am sure—unfortunately, because some megaliths would be a most welcome addition to our rather monotonous structural antiquities. I give a concise description of the three (grand total for Kenya so far) that are known.

1. TOBOLWA HILL, NORTH NANDI

(Top. ref. : Gen. Staff map $\frac{\text{north A–36}}{\text{W}}$)

The summit of this hill is a huge mass of granite, with a flat top. On the north edge, the rock has weathered into a semi-circular recess at one spot, and here lies a roughly shaped block of granite, square in section, broken into three pieces. Total length, 10 ft. ; breadth of uppermost face, 36 ins. at one end, and 30 ins. at the other. On the south side of the hill, where the rock does not fall sheer, there is a

platform of rock surrounding two-thirds of the summit, covered with lumps of rock that have broken off the summit. I have heard it said more than once that there is a stone circle here : but this is definitely not so. There are, however, two blocks of granite which do not appear to be in a natural position. The hill of Tobolwa is regarded by the local Nandi as being haunted. The whole summit, I believe, is to be gazetted as an ancient monument.

2. Kiboloss Farm

During ploughing operations in 1922, at the foot of Kiboloss Hill, was found a circle of stones, above, and close to, two earth hut-circles. The stones, which averaged about one foot square, were set touching each other in a circle of about 5 or 6 feet diameter. They were removed at the time, as they hindered the plough, and there is unhappily no sketch or plan of them.

3. The Selengei Stone

(Gen. Staff map, 1 : 1,000,000, south A–37)

This is at Selengei, about 15 miles southwest of Kiu railway station. It is a cylindrical block of stone, apparently a meteorite, about 2 ft. 6 ins. high, and is said by the Masai to be the figure of a girl who was turned to stone. At the same place are ' Azanian ' wells, now disused. The stone is a gazetted ancient monument.

G. W. B. Huntingford.

THE OLD ENGLISH TERM ' SNADE '

The term *snade* occurs locally as a suffix to place-names in the southeast of England. It belongs to that class of words : forest, parrock, chase, and the like, which have not only a descriptive but a legal connotation. Its meaning is that of a wood held in severalty, generally within the bounds of Andred or within forest areas under a similar custom of wood-right, near Andred : and in most cases, possibly in all, the woods known as snades were originally royal woods. Thus, in Kent, the weald, or common wood-pasture, of each lathe, had within it, often upon its northern border, a silva regis or *cyngessnade*, and these snades have survived in such modern forms as ' Kingsnothe ', which was once the ' cyngessnade ' of the royal town of Wye, and was given to Battle Abbey by William 1 together with its parent manor. The severalty which the owner possessed there consisted in the right to fell

timber, to make assarts, and to exclude the common right of pasturage which the weald once afforded to the Kentish communities in its quality of communis silva. At Wye, and, no doubt, elsewhere, the snade was used to provide wood-right for those tenants on the lord's inland who did not hold by gavelkind, and so had no common right in Andred.

The term is of great antiquity. A king's snade of Faversham is mentioned in a charter of 850 and a snade of the Meonwara (the Hampshire Jutes) in 823, and it is likely that the usage of such royal several woods was coeval with the lathe and weald systems themselves—coeval, I should say, with the settlement.

English charters and surveys show us the legal status of the snade and its fixed relation to the system of forest pasture, but they give us no explanation of the origin of the term itself. To get such an explanation, we must go, against all likelihood, to Italy, and to a period considerably earlier than the first recorded use of the term in English records. The Edict of Rothari, king of the Italian Lombards, was issued in the year 643. It contains, among others, the following provisions under the general rubric 'De Arbore Signato': 'Si servus sua aucturitate arborem, ubi ticlatura facta est inter fines decernendas, inciderit, aut moriatur aut redimat se cum quatragenta solidis', and, 'De snaida in silva alterius facta': 'Si quis propter intento, signa nova, id est ticlatura aut snaida, in silva alterius fecerit et suam non adprobaverit, conponat solidos quadragenta, mediatatem regi et mediatatem cuius silva fuerit'. The editor of this section of the Leges identifies the ticlatura which is here the Latin synonym for snaida with the taliatura of the Roman agrimensores, the incising of identifiable marks of ownership upon standing timber in order to establish a boundary, and his identification is clearly right. The Lombardic snaida and with it the Kentish snaed should be derived, therefore, from the same root as the Old English snaedan or snipan and the modern German schneiden: in the first instance the cuts made upon trees to mark the lines of a several copse, and, in England, by extension of meaning, the area which the boundary marks enclose. Rothari's edict gives to the lines of blazed trees which form such boundaries a legal guarantee of a clearly defined order—that which attaches to the charter and to the king's coin. The forger of charters, the coiner, and the man who counterfeits or defaces his neighbour's snaida, suffer the same penalty of the striking off of the hand that violated the sanctity of record.

There is nothing in these provisions to show that a system of wood-right like that of Kent prevailed among the Lombards. Rothari's

edict tells us only that the snade originally meant no more than the owner's mark upon the boundary line of his timber. From this first simple meaning there arose in Kent (but perhaps not among the Lombards) a secondary use. The wood enclosed within the snades or cuttings came itself to be called the snade. Clearly, this use could only arise in circumstances when private property in woodland was a notable exception, when the blazed signs of ownership conveyed a distinctive kind of protection and guaranteed a known and exceptional right. Woodland in the ownership of individuals could only be usefully classed and named as snade-land in a community for whom there was a natural antithesis to it in the common right in national or provincial forests. The snade, therefore, falls into that class of elements in English place-names which carries not only a description of natural features, but also a legal and an historical connotation. It reflects accurately and unmistakably a certain phase of early, distinctive, and narrowly localized custom. Such place-names as Snodland or Kingsnorth recall the form of institutions just as accurately as do the contemporary or slightly later Inlands, Huishes, or Bucklands, and much in the same way as the Chartervilles and Freetowns of the nineteenth century reflect the vaguer and more political motives of their own day. J. E. A. JOLLIFFE.

A NORTH COUNTRY DEW POND (PLATE III, p. 216)

Dew ponds such as those found on the south of England downlands are not often met with in the northern areas, nor indeed do I know of any made in the typical manner with puddled clay and straw foundation. There is however on the great headland of St. Bees, on the Cumberland coast, a curious pool known as Tomlin Tarn which according to local residents is a dew pond.

This interesting piece of water is shown on the 6-inch Ordnance Survey map of Cumberland, 72 NW, on the South Head almost due north of the signal flagstaff mound and the semaphore hut. It is near the 340.5 ft. bench-mark, no name being given to it on the map. The rising ground of Tomlin is however marked to the northwest.

The pool is thus on high ground of rough, uncultivated pasture-land, placed on a sort of saddle between the highest point of the South Head to the south and Tomlin and the North Head to the north ; it is protected further on the north side by a massive dyke-bank of turf such as was common during medieval times as a boundary line between different estates. In the present instance the landowners chiefly

concerned in this area of St. Bees Head were the Lords of Rottington (a branch of the great Cumberland and Westmorland family of le Fleming) and St. Bees priory. Rottington Hall lies about three-quarters of a mile down the hill northeast from Tomlin Tarn, while the priory is just over a mile east by south down in the valley running up from the sea-shore beneath the massive bulk of the headland. Over the dyke-bank cultivation begins, and there are rich ploughlands on the eastern and southern slopes where the scrubland of the summit of the South Head ends. A sixth of a mile to the west the headland falls away in a ragged cliff, 300 feet to the shore below. A mile and a half to the northwest, on the North Head, the white column of the light-house nestles comfortably, and a sixth of a mile due north of this is the point which Mr R. G. Collingwood suggests as being possibly the site of a Roman fortlet or signal station which must certainly have existed somewhere on this headland, which commands not only the Cumberland coast to the south, but also Solway shore and the distant line of the coast of Scotland.

Tomlin Tarn lies in a shallow, saucerlike depression in the rough grass : its bottom appears to be firm and gravelly, not peaty or muddy as pools so often are. It is quite shallow, nowhere more than two feet deep, with no trace whatever of any spring which can feed it though even in continuous drought it is not known to dry up. One St. Bees resident told me he had known the water blown out of the pool by tempest, but quite soon it had refilled to the usual water-level. A modern outfall has been constructed, down the slope to the east-north-east, to supply a cattle trough with water.

Radiating out of the pool are what look like foundations of walls, three feet six inches to four feet in width. What these foundations (which are made of good-sized stones, properly built), represent I do not know, for the history of the whole of the Headland is a series of gaps with here and there a tantalizing shred of story.

Prehistoric man bequeathed to us a polished stone axe or two ; we have yet to locate Roman remains, and tradition gives us the discovery in the early 17th century of a giant buried with his armour in a corn-field at Rottington. Charters of agreements between the Lords of Rottington and the priory of St. Bees mention as a landmark a great raise and a great heap of stones which suggest the existence of a big cairn or tumulus, possibly the mound upon which the signal-flagstaff of the South Head has been erected. There is a short section of ancient road and enclosures, more dyke-banks, and some grim shafts and tunnels

on the cliff edge known as Pattering Holes. During the Middle Ages there was no doubt a beacon post upon this headland where the monks from the priory grazed sheep and goats, the sheep cotes and goat pens being mentioned in the charters. All these things blend into a puzzle which wants patient sorting out. What connexion have any of these remains with each other or with Tomlin Tarn ? What in the beginning caused this sheet of shallow water to gather ? When ? Has it been there since before the dawn of history ? Did the Romans or Norsemen or monkish farmers engineer it into being ? Careful search along the shore of the pool yielded no remains of any kind to provide a clue. In a wall built of blocks of the red sandstone of the district, there are shaped stones which suggest that they have been voussoirs from some important building, and other stones suggesting their previous use for constructional purposes : this wall divides the rough grazing land of the South Head from cultivated land lower down to south and east, so that the stones noticed may have come from some building belonging to the monks, or they may possibly be of Roman origin. Nor is it possible to say if they can be in any way connected with the foundations of walls which form so intriguing a feature of Tomlin Tarn, that curious pool which never runs dry and upon whose surface no weeds grow.

MARY C. FAIR.

WHITEHAWK CAMP

It is expected that excavations will again be undertaken this year in Whitehawk Neolithic Camp, Brighton, under the direction of Dr Cecil Curwen, as a preliminary to the making of a new road across the camp by the Brighton Corporation. This will necessitate the clearing down to the bare chalk of a strip, 50 ft. wide, and about an acre in area, across the centre of the Camp, cutting each of the four concentric ditches twice. The cost will be borne by the Corporation, and the opportunity thus afforded of disclosing the internal arrangements of a large Neolithic Camp is one that is not to be missed. It is expected that the work will be undertaken during July. (See ANTIQUITY, 1930, IV, 28–32 ; 1933, VII, 476–7).

Recent Events

The Editor is not always able to verify information taken from the daily press and other sources and cannot therefore assume responsibility for it.

An expedition to Nubia, directed by Mr L. P. Kirwan, has opened a tomb of the 5th or 6th century A.D. at Firka, nearly 100 miles south of Wadi Halfa. One burial-chamber, not unfortunately the richest (as would appear) had remained unplundered, though the roof had fallen, and the great depth had caused dampness which destroyed wood, ivory and even some of the metal objects. The finds consisted of spears, bronze and pottery food-vessels, an elaborate lamp of Byzantine type, a green glass vessel, beads and scarabs. Human sacrifice had been practised, and there was no evidence that the inhabitants were other than pagan. ' Firka seems to have been a centre of some importance in Christian Nubia. In the neighbourhood the expedition has already discovered the sites of three churches '. (*Morning Post*, 23 January, and further discoveries 2 February, and 2 March).

Less likely to produce valuable results is a mission dictated to a Mr Paul Brunton (not to be confused with the archaeologist of that surname) by a ' High Priest of ancient Egypt and by a Greek philosopher of the neo-Platonic school ', as reported in the *Sunday Graphic and Sunday News* (3 February). Mr Brunton is following the time-honoured pathway to a secret chamber in the Pyramids containing ' incredibly old records which were the originals of Genesis of the Bible ', and he has been told by the Greek philosopher how to find a cache of books saved from the library of Alexandria ' maliciously destroyed by Julius Caesar '. The strange thing is that Dr Reisner did actually discover a hidden burial-chamber under the shadow of the Great Pyramid (see ANTIQUITY, 1927, 1, 216–18), which had been unaccountably missed by all the cranks and quacks ; but he found it by the use of his own sound judgment and by the application of scientific method, not by consulting a dead priest !

The following particulars of a cemetery found at Troy were published in *Nature*, 2 February :—' The long-awaited discovery of a cemetery at Troy is announced by Dr Carl Blegen, of the University of Cincinnati, in a communication issued by Science Service, Washington, D.C. This find was made by the third expedition of the University to Hissarlik. A second discovery of importance was on a site about three and a half miles from the actual citadel, at a marginal point of the area. Here Dr Blegen found four graves, apparently of neolithic age, containing skeletons which in his opinion belong to a period antecedent to any settlement hitherto found on the site and representing the earliest inhabitants. At the same point, but at a higher level, were later remains, dating from the time of the fourth and fifth layers of the citadel. The cemetery belonging to Troy itself was found just outside the citadel. It is contemporary with the sixth city and consists of a series of urn-burials containing ashes, remnants of burnt bones and traces of ornaments which had not been entirely consumed by the funerary pyres. The practice of cremation burial, naturally and unfortunately, has destroyed all evidence of the physical characters of the inhabitants of the city. A further discovery among the ruined houses was that of a well-preserved buried floor, which affords the first opportunity here for the investigation of a habitation site. The stone bases of columns which supported the upper story are still in place ; but determining the alignment of the columns and the recovery of any household goods which the floor may have preserved will be the work of the expedition's next season '.

It is stated that finger-prints on pottery have enabled fragments from different layers to be equated. (*Birmingham Daily Mail*, 25 January). There seems no reason *a priori* why this method should not be possible if the pottery is hard enough ; and we commend it to excavators to experiment with further.

Prehistoric implements made of glass have been found in the Libyan Desert by Dr L. J. Spencer, Keeper of Minerals in the British Museum (Natural History). We shall look forward to reading his report on these finds and hope that it will not be long in appearing. The

glass is of natural origin, but its precise method of formation is, we understand, still undetermined. (*The Times*, 28 January and 28 March). It has been suggested that it is the result of the fusion of desert sand by a meteor falling on it. Some of the earliest iron tools were made of meteoric iron (see ANTIQUITY, 1928, II, 226–7), and it would be remarkable if some of the oldest stone ones also had a heavenly origin.

Among recent acquisitions by the British Museum is an agate amulet modelled in the form of a frog. It apparently dates from the Agade dynasty of Ur (*c.* 2500 B.C.) and is the Museum's first acquisition of a first-rate example of the work of the sculptures of the period which produced the Naram-Sin stele in the Louvre. Its technique is however different, and is a new discovery, so far as its period is concerned, the work being performed by rubbing grooves in the hard stone with crushed quartz or corundum, while natural white bands in the agate have been used with astonishing ingenuity and delicacy of workmanship to render the eyes and enforce the shape of the body.

An extensive system of canals and sewers connecting a massive series of buildings now underground has been found at Copan, the ancient city of the Maya in Honduras, by an expedition of the Carnegie Institution of Washington. The buildings include amphitheatres in which are monoliths and large statues in stone. One of the most interesting finds is a pair of solid gold boots, nearly two inches high, of exquisite workmanship. This is important, as with the exception of two doubtful examples no other objects of worked gold have been found in the period of Maya civilization to which the ruins of Copan are dated. (*Nature*, 2 March).

Señor Luis Valcarcel, well known for his excavations in Peru, describes in the *Illustrated London News* (13 April) the mountain-citadel of Pisaj, an almost unknown Inca stronghold. The fortress is a wonderful example of ingenuity in overcoming the difficulties of a site such as the one on which it is built.

'Woodhenge' at Arminghall, near Lakenham Baths in Norfolk, is to be excavated this summer. It was first observed from the air by the Royal Air Force in 1929, and subsequently photographed by the Norfolk and Norwich Aero Club. The excavations are to be directed by Dr Grahame Clark and Mr Rainbird Clarke. (*Eastern Daily Press*, 28 March).

A summary of the third preliminary report by Dr Henri Frankfort to the Oriental Institute of Chicago on the excavations in 1932–33 at Tell Asmar, Khafaje, and Khorsabad in Iraq is printed in *Nature*, 23 March. The report (price 7*s*) has been published by the Oriental Institute as communication 17, and also by Cambridge University Press. It presents a valuable description of the discoveries on these sites.

We printed in ANTIQUITY, March 1934, pp. 95–96, a note by Dr L. S. B. Leakey on the remains of early man which he found at Kanam and Kanjera in East Africa. It will be remembered that Dr Leakey came to the conclusion that the remains occurred *in situ* in beds of Lower Pleistocene and Middle Pleistocene Age. In a letter to *Nature* of 9 March Professor P. G. H. Boswell, after a visit to the sites and having every opportunity given for studying the geology of the deposits from which the Kanam mandible and the Kanjera skull were obtained, gives reasons, on the grounds of the uncertain location of the sites and also of the doubt as to the stratigraphical horizons from which the remains were obtained, for not being able to accept Dr Leakey's conclusions.

In a letter to *The Times* (6 March, p. 15) Professor G. Elliot Smith records the first occasion of an X-ray photograph being taken of an Egyptian mummy. It occurred in 1903, when he and Mr Howard Carter took the mummy of the Pharaoh Thothmes IV to a nursing home in Cairo where Dr Khayat Bey was in charge of the only X-ray apparatus then in Egypt.

The head of a cult-image, with eyes of shells, has been found in Jericho by Professor Garstang, under a layer of Early Bronze Age deposits 21 feet thick. (*The Times*, 4 April).

In a report of the excavations at Tintagel, Cornwall, Mr Ralegh Radford rejects the association of King Arthur with Cornwall, ' attributing the legends to the later period of the Britons' retreat westwards before the Saxon advance '. The monastic remains found probably date from *c.* A.D. 500. (*The Times*, 29 March).

The Cumberland Excavation Committee have published their report for 1933. It describes excavations at a number of sites on the Roman Wall in Cumberland. At Birdoswald the investigation of the early phases south of the fort, was continued, and the relation of the multiple ditch system of the stone fort to the Turf Wall and Stone Wall defined. Turrets further west were examined, while at Castlesteads fort excavations determined the line of the fort walls, thus permitting a more accurate estimate of its size. The report is in the *Transactions of the Cumb. and Westmd. Archaeological Society*, volume 34, pp. 120–65.

The place of the Vallum in the development of the frontier works is discussed by Mr E. B. Birley in *Archaeologia Aeliana* (series 4, XI, 146–57) with reference to excavations in the last decade, and a date about the middle of Trajan's principate is suggested.

A summary of the results of the five seasons' excavations at Colchester undertaken by the Colchester Excavation Committee, written by Mr Christopher Hawkes, was published in *The Times* 12 April, p. 17. The dykes have been accurately surveyed and trial digging has confirmed that they are the genuine defences of Cunobelin's city. The Sheepen Farm area has been conclusively identified as the

site of the city itself and a fourth dyke (Sheepen Dyke) has been discovered. The Committee propose this year to explore the central area of the British city.

A ' recent event ' was made the occasion for a most interesting article in *The Times* (18 April, p. 13) by Sir Arthur Evans on ' News by Fire ', in which he traces the use of the beacon in Britain. Incidentally Sir Arthur points out that no systematic survey of the beacon-system exists and suggests that one should be undertaken. The first paper printed in *Archaeologia* (vol. I, 1770) was on beacons, and others have appeared at intervals in antiquarian journals. The beacons of Hampshire have also been well dealt with by Mr H. J. White, but a complete survey for the whole country would be of value.

Some remarkable sculptured slabs have been found on the site of the monastery known as ' Gallen of the Britons ', in Gallen Priory, near Ferbane, co. Offaly (Leinster). Two of the sculptures are believed to be quite new to Irish art, one, a 6–7th century slab, being possibly modelled on champlevé enamel-work. Another, known as the ' Marigold Stone ', is carved on both faces with a ' marigold ' design of radiating petals. (*Illus. London News*, 23 February). Mr A. W. Clapham remarked upon the marigold design in his article on Hiberno-Saxon Art in ANTIQUITY for March 1934, pp. 43–57.

An ' elephant ' tomb (so-called from the elephant designs on bronze vessels found in it) of about the 12th century B.C. has been discovered on the site of the Shang-Yin capital at An-yang, China, and is described by the Rt. Rev. W. C. White in *Illustrated London News*, 23 March. Some very remarkable Chinese bronzes are shown.

We have been asked by the President of the Royal Anthropological Institute to draw attention to a proposed anthropometric survey of the

racial history of Great Britain. The following letter has been signed by twenty prominent anthropologists and scientists :—

'Britain has lagged behind many other countries in carrying out organized research into the racial history and the present physical constitution of its population, though individual efforts of some magnitude have covered parts of the country.

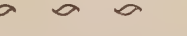
'To remedy this state of affairs and to encourage scientific cooperation, the Royal Anthropological Institute wishes to set on foot a comprehensive survey of the past and present populations of Great Britain.

'The methods by which such investigations can best be conducted are generally recognized. There is involved the arduous collection, reduction, mapping, and interpretation from more than one standpoint of a mass of data by a number of trained workers who can be found if the funds are available. Money will be required:

(1) To give grants to the workers who would take exact measurements of groups of living people and who would measure the skeletal remains preserved in museums and elsewhere; (2) to pay for the necessary scientific instruments; (3) to pay the travelling expenses of the workers; (4) to help towards publishing scientific reports and popular summaries of the results obtained.

'A really comprehensive survey would lead to conclusions of both scientific and national importance, conclusions which would throw light not only on our history but also on sociological and medical questions.

'Donations in aid of the projected Anthropometric Survey of Great Britain will be gratefully acknowledged by the Hon. Treasurer, Royal Anthropological Institute, 52, Upper Bedford Place, London, W.C.1'.



Quite a number of good books have appeared recently. We wish it were possible to publish immediate reviews of them, but it is not. The best compensation we can offer is to quote a few of them here and now. The 'Prehistory of Scotland', by Professor Gordon Childe; a volume of essays on Cornwall by Charles Henderson, called 'Essays in Cornish History', published posthumously; 'The Indus Civilization', by Ernest Mackay; 'Tell el Amarna', by John Pendlebury; 'The Spirit of London', by Paul Cohen-Portheim. The last is one of the best books of its kind ever written; it is refreshingly free from any taint of the artificiality which spoils so many books of this kind. It is extraordinarily good.

Reviews

OLD NORSE RELATIONS WITH WALES. *By* B. G. Charles. *Cardiff: The University of Wales Press Board*, 1934. *pp.* xii, 167 *with index.* 6*s.*

This is a painstaking piece of work, and even if of the nature of a compilation rather than of original research is a useful guide to a difficult subject. For though there is ample proof of Scandinavian relations with Wales, it is remarkable in view of the Norse kingdom of Dublin on the other side of the Irish sea how small is the evidence of permanent settlement in Wales.

The evidence of Scandinavian influence falls into several classes which are wisely kept separate in this book according to historic value. Chapter I deals with the chronicles and annals, English, Irish and Welsh; chapter II with the history of Griffith ap Cynan; chapter III, with the Norse sagas; while chapter IV is devoted to place-names and the very scanty archaeological remains.

The chronicles and annals can alone be considered of historic value in the strict sense of written material by authors (whether known by name or not) whose veracity, bias and opportunities of knowing the facts can in some measure be tested. Their reliability varies considerably, and it would have been useful to the reader, who is likely to be more familiar with the English chronicle than with the Irish and Welsh annals, if the author had given some criticism of his sources and discussion of their relative value. It is generally recognized that the Aberpergwm Brut is late, but suspicion is aroused with regard to some of the others when one finds (in the record of an event dated 870) Montgomery called (p. 14) by the Norman name Tre-faldwyn (Baldwins town).

There is no evidence of permanent Scandinavian settlement in Wales in these historic sources, unless we regard it (with the author) as permissible to include in the term Wales the old Cumbrian Kingdom of Strath-Clyde. Nor is there in the history of Griffith ap Cynan. This has hardly more real historic value than the Norse sagas, though it is good evidence of intimate relations between the Welsh princes of the last half of the eleventh century and the Norse rulers in Ireland. Intermarriages were frequent and many of the Welsh princes must have been half Scandinavian. Transfusion of legendary material in both directions was inevitable.

It was only in the Norse sagas themselves that there is any positive statement of Scandinavian settlements in Cymric Britain. The chief sources are the Egil's saga and particularly the saga of the Iomsborg viking Palnatoki (930–990). Here we read of a Norse kingdom in Bretland, ruled successively by Iarl Stefnir, Palnatoki, Biörn hin Brezki (the British) and Palnatoki's grandson Vagn. The credit of drawing attention to these references belongs largely to Mr Alex. G. Moffat of Swansea. The author does scant justice to Moffat's pioneering work. Repeated reference is made to his paper in vol. III of the saga-book of the Viking Club, but he is mentioned by name only to criticize his treatment of place-names, inherited from Fenton and Laws, and not surprising in a paper written over a third of a century ago. The author's debt is shown by the fact that he copies even the mistakes which escaped correction in Moffat's paper, and gives Palnatoki a wife *Ingibiargar*, which is, of course, the possessive case of the proper name *Ingibiörg* (p. 100).

Unfortunately we cannot locate the part of *Bretland* in which the settlements were situated. *Bretland* was the Cymric part of Britain in the 10th and 11th centuries and may have been anywhere from Cornwall to Scotland. On the whole it seems most likely to have been in the district of the Strath-Clyde Welsh. The name *Strae(t)–Cled Wealas* is only replaced in the English Chronicle by Cumbra-land after 944 when king Edward gave it up to the Scots king Malcolm. In Lakeland the place-name evidence of Norse settlement is convincing as shown by W. G. Collingwood, whose name, strangely, is omitted from the author's bibliography. We do not know the precise value to be attached to traditional material of the saga type. Its criticism belongs rather to the realm of Freudian psychology than to history. We see at work all the phenomena which modern psychology has disclosed in dream-phantasy and mythology, wish-fulfilment, identification, dissociation and replacement of heroic personalities, to the utter dislocation of chronology. The processes are seen in the history of Griffith ap Cynan. It is even possible that they have been at work in the account of the battle of *Vinheithr* in Egil's saga, which bears such a close relation to that of *Brunanburh*, but ante-dates it. An interesting suggestion of Eddison's is quoted on p. 97 that in Egil's saga details of *Brunanburh* may have been fused with those of an 'earlier and little-known battle in or about year 921'. If this is well-founded it would throw light upon the celebrated and much debated passage in the English Chronicle (MSS. A and F) which states that Edward was chosen as overlord by the Scots, Northumbrians and Strath Clyde Welsh (*Strae(t) Cled Wealas*) in 924, really in 921. In MSS. C and D (which do not make this statement) it is said that in 921 Edward 'timbered a burg at Clede-mutha'. The site of Clede-mutha is debated, but it is formally the exact equivalent of the Nennian *ostium fluminis Cluth*, at the terminal Roman fort of Antonine's wall at the mouth of the Clyde. Edward was evidently faced in 921 by the same coalition that Aethelstan defeated at Brunanburh in 935. (See *Arch. Cambrensis* 1921, LXXVI, 253). It has never been explained what events caused the submission of the Strath Clyde Welsh and their confederates to Edward. Can this have been the occasion of the 'smaller and little known battle' of 921?

The evidence of place-names is discussed in chapter IV. The author justly points out the weakness of the evidence, the inconclusive nature of test words like thorpe, lake and slade, the presence of Scandinavian loan-words (even *by*) in 10th and 11th century English (which may have entered with the Norman conquests in Wales), and the post-Norman introduction of Scandinavian names from Ireland. That there is a strong Scandinavian element in the place-names of the Welsh coast from Newport to Fishguard is certain. But the evidence of pre-Norman settlement is very weak compared with that of districts in Britain where settlements are historically witnessed. Nor does the evidence of place-names in Wales become stronger when inspected in the light of local knowledge. The street name *Womanby* in Cardiff (p. 152) is much more likely, in the opinion of the reviewer, to be *Hunde-manneby*, the quarters of the 'keepers of the hounds', than the 'farm or village of Hund-mathr' (proper name). It is near the castle and old shambles. What could look more Norse than *Turbernesdune* (p. 153) wrongly identified as Tumbledown on the Cowbridge-Cardiff road? Yet comparison of the documents and local knowledge convince the reviewer that it is a misreading of *Carvenesdune*, and is the down above the brook *Nantcarfan*.

One would have welcomed a comparison with the effects of the Norse settlements upon the place-names of Ireland. It might throw light upon the paucity of the Welsh evidence.

The English dialects of Pembrokeshire, Gower and the Vale of Glamorgan are not discussed. Their evidence might have been valuable, but they have never been systematically investigated by competent philologists. It is probably now too late.

It is clear that a large amount of first-hand local investigation is necessary. The printed documents (like Clark's *Cartae*) are full of misreadings and the original MSS are difficult of access, many being in private hands.

There is abundant Welsh material in the P.R.O. which has never been properly examined. It is much to be wished that someone could be found to endow the Welsh Colleges with research scholarships for this work. The qualifications are exacting—a knowledge of medieval Latin, French and Welsh, a good knowledge of English philology and some training in palaeography. Considering the rarity of such equipment more generous acknowledgment should have been made of the real achievements of amateurs whose work was too often one of lonely pioneering. Even with the advantage of academic training and advice pitfalls are numerous.

A few misprints have escaped correction (apart from the howler *Ingibiargar*). One of them is amusing and instructive as showing how a Scandinavian appearance can be given to a name in spite of modern resources of proof-reading. The name of the late Mr Albany Major appears on p. 3 as *Alanby* !

CLARENCE A. SEYLER.

JERNALDERSHUS PÅ LISTA. *By* SIGURD GRIEG. Publication of Instituttet for Sammenlignende Kulturforskning, series B, XXVII. *Oslo*, 1934. [*Williams & Norgate, London*]. *pp.* 142 *and* 41 *plates.* 16 *kr.*

The plan and structure of the primitive house are now occupying the attention of an increasing number of students, and this book by Sigurd Grieg, describing the houses excavated by Dr H. Gjessing and himself at Lista in the extreme south of Norway, is a contribution to the subject that will undoubtedly prove valuable. The dwellings belong to the 4th, 5th, and 6th centuries A.D., and are rectangular structures of stone and earth with wooden roofing. Readers of Dr Brögger's book (*Ancient Emigrants*) will remember his suggestion that the first Norse settlers in Orkney and Shetland included folk from the Lista district, whose ancestors, if not they themselves, had inhabited the houses here described. Dr Grieg has, as always, given us a finely produced book abundantly illustrated with plans and plates, and a most workmanlike account of a fine excavation.

T. D. KENDRICK.

ÖSTNORSKE RISTNINGER OG MALINGER AV DEN ARKTISKE GRUPPE. *By* EIVIND S. ENGLESTAD. Publication of Instituttet for Sammenlignende Kulturforskning, series B, XXVI. *Oslo*, 1934. [*Williams & Norgate, London*]. *pp.* 144 *and* 61 *plates.* 18 *kr.*

This is a competent study of a small but extremely interesting group of late Neolithic rock-carvings and rock-paintings in east Norway. It follows a volume in the same series on the carvings of north Norway and the Bergen Museum publication by Böe of those in the west. Dr Englestad has carried out a most thorough survey, and his technical pages, dealing with the cleaning of the carvings and his methods of copying and photographing them, will be of use to many field-archaeologists. To the descriptive account is added a capable and suggestive essay on early art, though we shall not all agree with the author that these carvings represent a contact-point between the naturalistic and the schematic traditions. It ought to be realized by archaeologists that an accidentally schematic

result can be, and often is, only a naturalism crippled by uneducated performance, instead of being the product of a definitely distinct aesthetic tendency. Dr Englestad does not, however, press his views over strongly, and his book is a remarkably good one. There is a full apparatus of references and a German summary. The illustrations are numerous and all excellent. T. D. KENDRICK.

DIE STEIN- UND KUPFERZEIT SIEBENBÜRGENS. *By* HERMANN SCHROLLER. Vorgeschichtliche Forschungen 8. *Berlin: Walter de Gruyter. pp.* 79 *and* 55 *plates.* 1933.

Transylvania was once the El Dorado of central Europe, and her obscure local museums are crowded with relics that suggest early connexions with Asia and the Aegean as well as with central Europe. Despite a few summaries, notably Nestor's masterly article in the 22nd *Bericht der römisch-germanischen Kommission*, little of this material is accessibly published, so Schroller's book with its 55 plates is quite indispensable to anyone wishing to understand the relations between Europe and the Near East. Nevertheless it must be remembered that Schroller's classifications are in a high degree provisional; for most of the material comes from unscientific diggings so that associations and stratigraphy are doubtful or unknown. In some cases Schroller's groupings are arbitrary: the Wietenberg pottery that he calls 'the oldest native Neolithic group in Transylvania' must on the contrary, as Nestor has seen, be assigned to the Bronze Age; the *Furchenstich* and *Linsenkeramik* of central Transylvania may be contemporary rather with the Schneckenberg culture of the Alt valley than with the earlier painted ware of Erösd type against which Schroller elects to plot them. Through ignorance of the East European material (the work was composed before the appearance of Äyräpää's paper on Russian battle-axes, of Schmidt's *Cucuteni* and of *Dacia* III) and that from Asia, the author over-emphasizes northwestern connexions, *e.g.*, in the battle-axes, and uses the clay stamps for an absolute chronology that they cannot furnish. (Still it is something that he admits their Asiatic inspiration!). Finally he is obsessed with the idea of Nordic invaders. To discover them he repeats the absurdity that the rectangular house is necessarily Nordic (as if rectangular houses had not been used in Asia since the earliest mat-hut of the Sumerians!) and divides up the Erösd culture in a way that finds no support in the stratigraphy of the site. V. G. CHILDE.

DIE NORDISCHE RASSE BEI DEN INDOGERMANEN ASIENS. *By* HANS F. K. GÜNTHER. *Munich: Lehmanns Verlag*, 1934. 7.50 *marks.*

Professor Günther's numerous writings merit serious attention; for he is a leading exponent of the anthropological creed of contemporary Germany, and the authority cited by Dr Frick, German Minister for the Interior, in his official memorandum on the teaching of history in state schools (translated in *Nature*, 24 February 1934). An integral part of the dogma in question is the identification of the 'Nordic race' with the original speakers of Indo-European languages. The present work is devoted to discovering traces of Nordics among Hindus, Persians and other 'Aryan-speaking' peoples of Asia, and at the same time to expounding the lessons in 'racial hygiene' to be learned from their fate.

On the anthropological side the 'proof' that 'in early times and even today a Nordic aristocracy is traceable among' these peoples, follows lines familiar from Zaborowski and kindred writers of last century. The net result is that certain physical characters

(sometimes mere longheadedness is cited) that are frequently associated together among some populations of northern Europe today, can be observed sporadically, and perhaps more often in the past than now, among Brahmans, Kurds, Persians and Afghans. Our confidence even in this demonstration is shaken if we check the author's references; nothing for instance in Fawcett's article on the Naqada crania (to which we are referred) justifies the statement that 'Nordic hordes must already (*i.e.*, about 6000 B.C.) have reached Upper Egypt where their skeletons have been found at Nagada'. In any case the number of anthropologists who would infer blood relationship from the sort of characters cited by Günther, or would recognize embodiments of a 'race' (which Günther defines as a genetically pure human stock distinct from all others) in ancient statues or paintings, is today rapidly dwindling as the results of modern genetics penetrate into anthropometrical laboratories.

But Günther's Nordic race was 'distinguished from all others' by psychological as well as physical peculiarities. The former can then be used as well as the latter to demonstrate its presence in Asia, and agreements in habits, in outlook, in religion and in art between Vedic Hindus, Old Persians, or Tocharians on the one hand, and Germans or Kelts on the other, can be taken as manifestations of the Nordic 'race-soul' at work in the Ancient East. It is needless to point out that these immeasurable and largely subjective qualities are not susceptible of the statistical treatment by which the measurable physical characters of racial groups might be sorted out in a mixed population. Unless one accept on trust the metaphysical postulates of the racial theory of history, the cultural agreements on which Günther insists can be explained in other than genealogical terms—like language, by social instead of biological inheritance or as reflexions of given economies. While the author successfully emphasizes the difference in outlook between say Vedic Āryas and the industrial and commercial townsmen of Babylonia, he ignores similarities to that of the peoples of inner Asia, such as Koppers has recently stressed.

In supporting his case by data drawn from archaeology Günther, a physical anthropologist, is handicapped on the one hand by insufficient acquaintance with the results of recent excavation in the Orient, and on the other by a certain hesitation between the divergent views of specialists on European prehistory. He makes no reference whatever to the pre-Aryan Indus civilization, and treats Iran as a virtually empty tract which the Iranians could colonize *en masse* about 2000 B.C. On the other hand Günther sometimes seems inclined to use the painted pottery culture of southeastern Europe as a link between the Indo-Europeans of Asia and Europe; once he speaks of 'an advance of the Painted Pottery from southeast Europe to Musyan and Susa'—a chronological and stylistic absurdity from which a reference to the magnificent work of his countrymen at Erech might have warned him. Yet he regards the Corded Ware folk as 'the founders of the several Indo-European peoples', 'the core of the Indo-Germans'. This view is frankly attractive as far as Europe is concerned, but no traces of the Corded Ware culture are here disclosed in Iran or India.

Incidentally one is somewhat disconcerted to find Sennacharib called a 'Babylonian king'.

V. G. CHILDE.

NEW LIGHT ON THE MOST ANCIENT EAST—the oriental prelude to European prehistory. *By* V. GORDON CHILDE. *pp.* XVIII, 326. *Kegan Paul*, 1934. 15*s.*

After a preliminary account of 'the setting of the stage' the author passes in review the recent epoch-making discoveries in Egypt, Mesopotamia, India, Iran and Syria. Although naturally based upon published accounts for the most part, the book is not

merely a compilation. The author recently visited the lands described and the sites and museums there, and he writes therefore with the freshness and authority of an eyewitness. The book is vitiated by a long list of blemishes ranging from mere misprints, wrong references (an old trouble) and other slips to a bad index and an inexcusably shoddy sketch-map. None of these in themselves is of much importance, and all can be got rid of in the next edition ; but they annoy the reader and they should never have been allowed to pass the proof stage by a careful author.

A table of cultural synchronisms would have lightened the labour of reading parts of the book, which are hardly intelligible in their present form except to a specialist.

These shortcomings can all easily be got rid of. The rest and by far the greater part of the book is so good that it is certain to pass rapidly into a second and other editions, and to be used by students for some time to come. There is nothing else that covers the same ground, nor could it have been written by anyone but Professor Childe, with his vast knowledge, great powers of condensation and almost world-wide range of first-hand experience. One of the nicest points made is the comparison between Rome and Sumer (pp. 133–6). The Sumerians are defined as ' the authors of that peculiar civilization which inspired Hither Asia for two millennia as Roman culture inspired Europe '—a most stimulating and original analogy. It is interesting to note that the unification of Babylonia, a great historical event, was carried out by Sargon, a Semite—we are reminded of the sub-title, with its hint of trouble to come for Nordic maniacs. In this connexion it is amusing to note that the swastika and the cross were religious or magical symbols in prehistoric times in India, Elam and Babylonia, when our own racial forbears were placidly munching whelks on the shores of the Littorina sea (p. 222). Tin occurs in Khorassan, and ingots have been sold in the market at Meshed in modern times (p. 187).

It is always dangerous to make abstract inferences of a social kind from mute archaeological and geographical evidence, but legitimate to do so up to a point. We have nothing but praise for the author's attempts (pp. 178–9, 204–8). From the raw materials here presented will some day be written the history of the emergence of organized social life. It may even be possible to make some attempt in our own time, and no one could do so better than Professor Childe. O.G.S.C.

ANCIENT EGYPTIAN MATERIALS AND INDUSTRIES. *By* A. Lucas. (Second edition,[1] revised and greatly enlarged). *Edward Arnold*, 1934. *pp.* xii, 447. 16*s.*

If a book similar to this were written for every important and homogeneous archaeological area the task of archaeologists would be made much easier. Mr Lucas, Chemist to the Department of Antiquities in Cairo, has compiled a most scholarly work in which every scrap of evidence that concerns the material used by ancient Egyptians is discussed and examined and a thorough scientific explanation given of each material. As a book of reference this will be invaluable to all archaeologists, for while Egypt seems to have preserved samples of almost everything used in their daily life, other regions at least preserve a reasonable proportion. Mr Lucas has virtually superseded his earlier and smaller work on the same theme.

He describes the methods of wine and beer-making, and the Egyptian knowledge of sugar ; he discusses textiles and builders' materials, paints and minerals. Of great importance are his discussions of metals, for his statements are both the latest and the

[1] The first edition was reviewed in Antiquity 1927, I, 497.

most scientific available. Without paying too much attention to fantastic views he disposes finally of mysterious suggestions that Egyptians cut their hard stone monuments by the aid of some very hard metal, or with bronze and copper tools mysteriously hardened. He explains clearly enough how bronze is hardened by beating and annealing, so that a specimen of bronze with an initial hardness of 136 was after hammering increased to a hardness of 257. But even so it would have nothing like sufficient hardness to carve diorite or granite. These stones he explains, following Reisner, were worked by the simplest and most primitive processes: the harder the stone the simpler the process. For the most part it was simple pounding and abrasion. Bronze in Egypt he thinks was not in full use until the 18th dynasty and the beginning of the Bronze Age he puts at the 12th dynasty. Before that copper was the metal universally employed. The earlier use of bronze in Mesopotamia shows that it is an Asiatic invention which spread to Egypt and Europe.

The working of stone he explains was largely done by abrasion, the tools being of stone used with an abrasive, metallic chisels hardly being used at all. Much extensive cutting was also done with the tubular drill and abrasive sand. He disputes Petrie's theory that the drills were fitted with cutting points of emery or other abrasive, and thinks that the marks inside drill-holes which led Petrie to that conclusion are caused by the accidental intrusion of larger fragments of the abrasive into the drilled hole, so that they clogged the drill. In other words what Petrie thinks are intentional teeth fitted to the edge or sides of the drill are in fact accidental. Nor does he believe that the Egyptians employed emery, which he thinks was too far away for import. The only Mediterranean sources are Naxos and Asia Minor. He proposes the hypothesis that they used quartz sand, which would cut anything as hard as quartz, on the same basis that diamond cuts diamond. His reason for rejecting emery is, he thinks, strengthened by the fact that objects of emery stone are found cut into ornaments and utensils and this to him 'seems a contradiction of its use as an abrasive'. And yet on the same page he quotes the instance of certain South American Indians who cut rock crystal with quartz sand. Surely if the Indians could cut crystal into ornaments with crystal sand, then Egyptians could cut emery into ornaments with emery sand. This is an unexpected logical confusion in an otherwise very clear and lucid section.

He has hard words to say to certain archaeologists in the little matter of a theory of the importation of Transylvanian gold to Egypt. He shows how this hypothesis is based on a chemical assumption that will not hold water. In his catalogue of sources of Egyptian gold there seems no doubt that Egypt could provide all her own supply. His account of methods of refining and plating is of great value.

In the matter of iron also he has some painful surprises for the archaeologist, The early existence of iron, postulated by three reputable authorities, for working hard stones he disposes of rapidly enough. But he also refuses to accept the earliest recorded instance of a substantial non-meteoric iron object, the famous iron spear-head from Buhen. 'That iron should have been known and used in this way 400 years before the king of Egypt himself possesses only one iron weapon, as a rarity (Tutankhamen's tomb) is so extraordinary ' that more evidence must be adduced before the date assigned to this object can be accepted, especially as it is practically identical with spear-heads used until not many years ago in the same locality ' !

His views on tin are full of common sense. He believes that tin was first discovered by being mistaken for copper ore. It was collected from stream beds in the form of tin oxide, or cassiterite, and he suggests that it was first detected by gold-washers. Its

metallic nature and heavy weight first caused it to be noticed. He considers that the invention of bronze took place probably in northwest Asia and that one likely candidate is the Kesrwan district of Syria, near enough to Byblos to explain the importance to Egypt of that town. The discovery of tin, in short, was due to the supposition that the heavy nodules of cassiterite were a kind of copper ore. Mixed with copper ore it would have produced bronze unexpectedly: smelted separately it would have produced pure tin which would then have been added to the smelted copper experimentally.

The account of minerals and precious stones is important. But there are some surprising statements. The statement that nephrite is found in the Kwen Luen mountains in Kashmir and apparently nowhere else revives a heresy as old as Schliemann. Nephrite is found in Switzerland, Greece and largely in Austria. These were the sources of Trojan nephrite axes. Jadeite, of which several specimens occur in Egypt, is found, says Mr Lucas, ' only in Upper Burma ' ! This statement alone makes it essential that he should revise this section. His own caution that finds Naxos too far for Egypt to send to for her emery (although Egypt was trading with Crete from the early dynasties, and Crete is a day's sail from Naxos), and Transylvania too far for gold, should here have suggested to him that Burma is an even more exhausting trip for the unadventurous Egyptian ! Or did the Burman come to Egypt ?

He states further that the chief source for Lapis Lazuli is in Afghanistan and that no confirmation is obtained of the existence of this stone in Persia, as has always been assumed. Again he sends the maker of the Trojan Lapis Lazuli axe of Troy II on a very long trip to the east, while the artists of Ur would have had to travel only a little less far. Actually Lapis Lazuli is found in Transylvania, Russia and Siberia.

Apart from these few but serious defects the author has given us a most important practical handbook. It will be many years before it is superseded. STANLEY CASSON.

MEASURES AND WEIGHTS. *By* FLINDERS PETRIE. *Methuen*, 1934. *pp.* x, 22. 2*s.*

This small book opens with an interesting preface by the author, in which he remarks, ' We realise from weights how civilisation extended from 5000 B.C. over the widest span of the Old World, and we see how they testify to the community of culture ' ; and again, ' measures and weights are the great revealers of the community of the world in trade and population '. He describes the method of discovering the units of measure employed, from a consideration of the dimensions of a building, and the variations to be expected. Variations in measures and weights are inevitable. Thus, it appears that a uniform set of four Egyptian weights gave the probable error of any one weight as 3 grains, out of a mean of 149.3 grains (one qedet), a variation of about one in fifty. There is a short paragraph on the royal cubit of Egypt, which was 20.62 inches, with the curious speculation that the diagonal of the square of this cubit (the double remen), which comes to 29.161 inches, ' is almost exactly the natural length of a pendulum which swings 100,000 times in a day ; at the latitude of Memphis this would be 29.157 inches '. In his brief paragraph on the northern foot Sir Flinders remarks that 13.2 inches is the English medieval foot ; from that he derives the old mile of 79,200 modern inches. It is interest-into to recall the fact that more than fifty years ago, Mr W. Flinders Petrie wrote a paper on ' The Old English Mile ' in the *Proceedings* of the Royal Society of Edinburgh. He then found that the mean value of the old mile, derived from the Bodleian Map of England, of about the year A.D. 1300, was 1.265 of the present statute mile, that is about 80,000 inches, sufficiently near to the above-mentioned figure if we consider that the

value is taken from one map only. Altogether 6 ancient lineal measures, 7 ancient measures of capacity, and 8 measures of weight are dealt with. There is much information packed in this useful little handbook. C.F.C.

MARATHON AND SALAMIS. *By* COMPTON MACKENZIE. (Great Occasions series.) *Peter Davies*, 1934. *pp.* 169 *and* 4 *plates.* 5*s.*

Oddly enough no one has before thought of writing a consecutive account of the Persian Wars for general and semi-popular consumption, without too much insistence on the academic disputes that almost block the path of the historians of these troubled events. No better pen than Mr Mackenzie's could have been chosen for the task. He knows Greece, he knows Greek, and he has made adequate researches into his subject. The result is an eminently readable book in which commonsense gives him much help in dealing with the thornier problems.

Today the lesson of the Persian Wars again comes into prominence. Mr Mackenzie makes some forceful modern comparisons. He reads present conditions into past events. And he corrects wrong impressions. The Greek victories did not save Europe from Barbarism, but rather from its absorption into a Totalitarian State. Persia was the first, and perhaps the finest attempt to transform the whole world into a systematized '*oikoumene*', in which the benefits of supreme organization and perfect tolerance would be conferred upon its citizens. For Darius was a really great man: 'not one of the Greek leaders', says the author, 'in regard to the finer qualities of man, is worthy of being matched against Darius, unless it be Leonidas, of whom, except for that superlative act of self-abnegation, we know nothing'. On the other hand all the Greek leaders gave evidence of corruption, incompetence, petty jealousy, and total inability either to think in terms of Greece or to conceive a really national strategy against the invader. And yet the Greeks won, and by winning handed to posterity a handful of ideals, partly tawdry and trivial, partly permanent and fundamental, which the Persians lacked. That is what makes the Greek victories and the Persian wars into a turning-point in the world's history far more important than any single subsequent event.

This in brief is the gist of Mr Mackenzie's claims, and on the whole he is right. His odd claim that the Irish Rebellion of 1916 is the only gesture comparable to that of Leonidas made on behalf of pure liberty during this century, might be taken seriously if the equation Irishmen-Greeks in matters of intellectual and spiritual culture could be established.

In this short book the author has found occasion to make two quite solid contributions to historical controversy—one that the tactics at Marathon of the 'retiring centre' (not unlike the 'elastic defence' of the Great War) were repeated at Salamis on the sea: and that from that repetition one is entitled to conjecture that Themistocles was a moving force in the strategy of Marathon. The other that at the end of the 6th century B.C. the Spartans were seriously considering a concerted move with the Scythians against Darius in the form of an attack on Asia Minor. This conjecture he bases on the fact reported by Herodotus that a Scythian embassy came to Sparta for that very purpose. Mr Mackenzie would hesitate to reject this as mere gossip. They seem at any rate as good as the innumerable conjectures provided by the professional historians, and deserve to be examined seriously.

The illustrations are uneven in quality. Two vase-paintings and a small bronze give illustration of contemporary warfare. But the dreadful cut of the Plataean serpent

at Constantinople, surrounded by its Victorian iron railing, is wholly unworthy of the book. The list of illustrations also tells me that there are two maps on the endpapers. By an intolerable oversight on the part of the publisher these maps appear to have been completely forgotten. So that one has to read the tactics of the battles mapless.

S. CASSON.

L'ART BYZANTIN. Vol. II. *By* H. PEIRCE *and* R. TYLER. *Librairie de France, 110 Boulevard S. Germain, Paris, 1934. 208 plates, with 141 pages of introduction and descriptive notes on plates, and map. Each volume, about £4.*

All Byzantinists will welcome the appearance of the second volume of Peirce and Tyler's important work, *L'Art byzantin*. To many it will be even more welcome than the first, since, whereas the one dealt with the period of formation only, and contained little that was purely Byzantine, the second volume is concerned mainly with the 6th century, aptly termed the ' First Golden Age ' of Byzantine art.

Like the first, this volume is in the form of a collection of plates, each of which is discussed in detail in the first part of the book. The descriptions are preceded by a short introduction. After an historical summary there comes an appreciation of 6th century Byzantine art. The various branches of the art are then considered in turn : mosaic; wall painting, which is of minor importance at this age (p. 33); marble wall revetment; pavements, which, though few have survived, deserve a more detailed consideration than they have heretofore received—that at Sabratha in Tripolis is a superb work of art ; sculpture ; silver-work, jewels, enamels ; manuscripts ; and finally, textiles.

It is the last section of the text that is the most important, for it is a great deal more than a mere summary of the subject. The authors provide much new information about early silks, and supplement considerably the studies of Van Falke. In brief, they assign more initiative in this important art to Byzantine culture than previous authorities have done, and they go so far as to say that practically none of the surviving silks of Persian character, such as those bearing the famous gryphon in circle-motive, can definitely be attributed to Persia. Egypt, Syria, and probably also Constantinople, were centres as important, if not more so, than Persia, and work that has been preserved in the various treasuries of the West is mostly to be attributed to the Nearer rather than to the Middle East. The authors distinguish also a number of more detailed groups than Von Falke was able to do, and they hint that one of them, characterized by its elaborate, brightly coloured decoration (*e.g.* the Vatican stuff with Annunciation and Nativity in roundels) is perhaps to be assigned to Constantinople. After the introduction of silk culture by Justinian, in fact, the capital probably became the most important centre in the Nearer East, though it is only in Egypt, where actual specimens are found *in situ*, that we can be certain as to the exact provenance.

One mistake in the bibliography may be noted—*Guida di Ravenna* is by C. Ricci, not ' D. Talbot Ricci ', while *Byzantine Glazed Pottery* is by D. Talbot Rice.

The plates are excellently reproduced and constitute a complete and most enlightening survey, wherein the dated monuments of one art are employed to best advantage to aid the assignation of dates to uncertain ones in other arts. The conclusions which the authors draw are in every case important, and in most instances they seem certain. Three dates may however be questioned. The slab bearing the Archangel Gabriel (pl. 32), which is assigned to the 6th century, has thus certain characteristics of the 9th century, while the busts of the Apostles on the arch from St. Mary Panachrantos at Constantinople

(one is shown on pl. 15, a) are again quite possibly later, though in this case the later date is less well indicated.

The period to which the Kiti mosaic in Cyprus (pl. 127) is to be attributed is a more complicated question, since evidence as to its 9th century date is just as convincing as that in favour of the 6th century. The colouring, style and composition of the mosaic and the types of faces of the figures—it was not actually seen by Peirce and Tyler—support very strongly the later date, while the iconography and the nature of the inscription support the earlier. But an archaic wording and arrangement might well have been retained through conservatism in a provincial place like Cyprus, while a craftsman who had been trained in a more up to date type of art would be allowed free scope as regarded the actual work. We can only hope to get further with the dating of the early mosaics when the work in St. Sophia at Constantinople has been completed. It is to be regretted that it was not possible to include a photograph of the apse-mosaics in the Sinai monastery, which are definitely of the age of Justinian, but which have never been adequately published.

These are however but three plates out of the 208 that go to make up the book, many of them with several figures on each. The criticisms here set forth are thus of detail only, and the authors are to be heartily congratulated on their work. May the remaining three volumes—if the work can really be compressed within those limits—be speedily forthcoming. D. Talbot Rice.

BEITRÄGE ZUR KENNTNIS DER STEINZEITLICHEN MUSIKINSTRUMENTE EUROPAS. *By* Otto Seewald. *Vienna : Anton Schroll*, 1934. 12 *marks.*

We have read this study with the greatest interest, enhanced, possibly, by the fact that we took it up with some misgivings. Though we learnt in Sunday-school that Jubal was ' father of all such as handle the harp and organ ' in the days before the Flood, the combination ' Musical Instruments ' and ' the Stone Age ' comes to us with a semblance of incongruity. Yet this is quite unreasonable. Rhythms—often highly complex—and the varied pitch of sounds give pleasure to the most primitive peoples that can come under our observation. There is no valid reason why the men of the Stone Age should not have enjoyed the like pleasure, and fashioned contrivances by means of which to gratify it.

A modern orchestra is classified into three departments—the strings, the wind, and the percussion instruments. The first of these do not find any prototypes among the materials here brought together, but this is easily comprehensible. Primitive stringed instruments are necessarily made of perishable materials ; the lyres and fiddles of the Stone-age Jubals would not have had the slightest chance of surviving to our day in any recognizable form. Their place is taken for us by certain noise (rather than music) making instruments, such as bullroarers, and what are here called *Schrapern*—toothed rods of bone, along which another rod is smartly drawn : an instrument of the same class as the watchman's rattle, or the stick-and-railings combination beloved of the street urchin.

The other two departments are well represented ; we treat the fife-and-drum band with a new respect, when we realize the antiquity of its component instruments. Primitive flutes or pipes would, in ninety-nine cases out of a hundred, be made of reeds rather than of the less easily worked bone. The large array of wind-instruments of

bone which the author has succeeded in collecting thus becomes all the more imposing. Some of these are simple whistles, but others are rudimentary flutes, with finger-holes, and thereby made capable of emitting sounds of different pitch. They are not, perhaps, all equally convincing: and we could wish that the queer figure from the *Caverne des Trois Frères*, explained as a man in an animal mask playing a flute, were a little less sketchy. If the explanation be sound, the instrument must be a nose-flute.

The instruments explained as drums are a well-known central European type of pottery objects. They are (roughly speaking) of a dice-box shape, open above and below. The author would complete them with a now disintegrated skin, stretched over the mouth, and beaten as the skin of a drum is beaten. And with the modern oriental *derebukkeh*, which is constructed in just such a way, staring us in the face all the time, we can only wonder why we never thought of this before! With his clay drums the author combines bells and rattles of the same material—the latter, certainly, have long been known from excavations in the Near East; and the case that he makes for his theory is most persuasive.

The reader who wishes to profit to the fullest extent by the study of this book will have to prepare himself by a mastery of Menghin's great *Weltgeschichte der Steinzeit*, for the author, a pupil of Professor Menghin, has adopted the complex terminology which his teacher has introduced. R. A. S. MACALISTER.

THE HADRIANIC SCHOOL: a chapter in the History of Greek Art. *By* JOCELYN M. C. TOYNBEE. *Cambridge University Press*, 1934. *pp.* xxxi, 254 *and* 59 *plates*. 42*s*.

The tendencies of criticism embodied in this important volume are expressed in its title: if it appears at first sight misleading to apply the term *school* to what would ordinarily be called a phase, style or period of art, the use is motivated by a desire to emphasize the common Imperial impulse of the times. Dr Toynbee sees that under Hadrian, and doubtless under his personal influence, the artistic achievements and conventions of the classical and Hellenistic Greeks were applied to the expression of the spirit of the age[1]; and the Roman Empire itself she regards, in many of its aspects, as the culmination of 'Greek' developments and itself essentially 'Greek'. The heading of the first page of text, 'The Roman Empire in Greek History', indicates the angle of vision from which these Hadrianic developments assume their place in perspective as 'a chapter in the history of the art of Greece'. And the 'Summary' at the close of the book opens with the sentences: 'The age which we name "Hadrianic" after a Roman Emperor may be truly regarded as the high-water mark, or culmination, of ancient Imperialism as conceived by Greece—an age in which the Empire was so firmly knit together that the central government could afford, as never before, to encourage interest and pride in local culture, history and antiquities, especially in the cities of Greece and of the Hellenised East. Hadrian was the real author of the "golden age of the Antonines" in the second century; and it was the developed, Hadrianic ideal of the unity of mankind that the third and fourth centuries struggled to keep alive, until the division of the Empire at the beginning of the fifth century symbolised the defeat of that ideal and heralded the final dissolution of the ancient world. So, too, we may see in Hadrianic art the culmination of Imperial art, of Greek art in the Imperial phase'.

[1] For *saeculum* in this sense there is even more exalted authority than that to which reference is made on p. 239: for Trajan's 97th letter to Pliny closes with the words: *Nam et pessimi exempli nec nostri saeculi est.*

As regards the matters immediately under consideration, the author writes as both archaeologist and historian : her deductions are based on a full study of certain classes of Hadrianic coins, especially the ' Province ' series, together with the Antonine ' Province ' series—products of ' official ' art ; and also of certain classes of Hadrianic sarcophagi and altars—these forms of relief sculpture being ' individualistic ', ' unofficial ' manifestations. And these detailed and original investigations are preceded by an introduction, partly dealing with broad historical questions and partly providing a brief survey of certain classes of ' monumental evidence, outside the scope of the book '.

The value, and the timeliness, of Dr Toynbee's work will be obvious from this outline ; it has gone far toward rescuing from neglect one of the most momentous periods of antiquity, and it demands respectful attention for an Imperial Personage whose appeal to our age, owing to temperamental qualities on both his side and ours, has hitherto not been altogether effective. The thoroughness and competence with which this task has been accomplished require no emphasis here : the numismatic section has already received the commendation of Mattingly.[2]

In an age when scientific thought and distinguished writing tend more and more to become divorced, we hesitate to carp at a literary product so admirable as Dr Toynbee's introduction ; and yet we cannot resist the feeling that the very felicity with which she has in a few pages presented a résumé and critique of the results of European scholarship during recent decades has tended to induce a false sense of security, and to gloze over the serious difficulties that still exist. But, beyond suggesting that the Near East may still have much in store that will eventually be found to bear on these problems, we cannot pursue the theme further here.

The limitations of the book are indicated in the title ; for in spite of its considerable bulk it remains ' a chapter ', dealing adequately with only some aspects of what it is still convenient to call the art of the Roman Empire, and dealing with these from the standpoint not of Rome but of ' the Greeks ', a term which is here given a somewhat nebulous connotation topographically, chronologically and racially. And the inclusion of the Antonine ' Province ' series of coins and also the Antonine reliefs of Provinces suggests that the artistic heritage left by the Emperor whose name adorns the title-page was so completely assumed by the immediately succeeding princes as to make the sole mention of Hadrian, though in part justified by his commanding position, somewhat arbitrary. But to express a desire for ' more ' is to pay the book a compliment : the high standard of scholarship achieved in the detailed studies, and the many incitements to further enquiry and research provided by the more general discussions, combine to make it one of the most stimulating archaeological and historical volumes that has appeared in recent years. We trust that we may look to its author for further guidance along the difficult but fruitful paths which she has outlined so well. A. W. Van Buren.

THE HOME OF MANKIND : the story of the world we live in ; written and pictured by Hendrik Willem van Loon. *George G. Harrap*, 1933. *pp.* 506, *with* 156 *illus.* 12*s* 6*d.*

This book represents the attempt of a literary man to write a text-book of geography that can be understood by everyone, in a style to arouse and hold his attention. It has

[2] *Num. Chron.*, 1934, 138–9.

the merits and weaknesses that are to be expected from such a venture. It possesses the very great merit, outweighing all else, of being both interesting, arresting and intelligible; one certainly does not have to keep re-reading sentences to discover their meaning. It is full of pregnant remarks such as: 'The Strait of Magellan is of course of great strategic importance; hence the Falkland Islands which guard it are British Territory'. There is a refreshing absence of commonplace cant in his prejudiced description of the ancient Romans as 'gangsters and racketeers who . . . despoiled all of Europe'; and in his regret (when in St. Peter's at Rome) for 'the waste of so much money upon a building that had not a single claim to either beauty or charm'. (A similar opinion was expressed, we believe, by Ruskin).

But it has the weakness, on the scientific side, of occasional lapses that betray an inadequate equipment (though who of us *is* properly equipped for such a huge task?). It is not true to state (p. 131) that 'your guess is apt to be as sound as mine', if the speaker is Mr van Loon and the reader one who has given up his whole life to, let us say, the study of ethnology or archaeology or geology. Such a reader would never set equal value upon the 'Atlantean' theory and one which associated Basques and Berbers. Then, the chapter on Great Britain contains several gross errors, such as the statement that the Romans 'had not fortified the east coast [of Britain] because it had not been necessary' (p. 221). The Saxon Shore forts and the signal stations of Yorkshire are marked on the Ordnance Survey map of Roman Britain, which is not mentioned. There is no evidence that the Phoenicians ever visited Britain or the Scilly Islands (see chapter v in Mr Hencken's recent book on Cornwall). The description of Angles and Saxons on p. 222 is full of strange lapses and displays an extraordinary ignorance of early English history. The attainments of the Anglo-Saxons in art and civilization are completely overlooked; the continental achievements of Alcuin and Boniface, the apostle of Germany, are not even mentioned. And Bede (who, *inter alia*, tells us where the Angles came from) was a historian of no mean calibre, without a peer in his own time and for long afterwards.

Whether a book that is of such unequal merit deserves to be recommended to the readers of ANTIQUITY is a problem that is difficult to decide. Some will find it entertaining; others will instinctively dislike it. But one can forgive much in a geographer who is both human and readable; and the best course to recommend is that the book should be bought and read. O.G.S.C.

A HANDBOOK OF GREEK LITERATURE: from Homer to the age of Lucian. *By* H. J. ROSE. *Methuen*, 1934. *pp.* VIII, 454. 21*s.*

Mr Rose writes as well for the student making his first acquaintance with Greek literature as for the more advanced inquirer into detail. The latter will appreciate the convenience of finding, in one volume of continuous narrative, information otherwise scattered throughout various works of reference and now brought up to date; the former, it must be candidly admitted, is not likely to be unduly exhilarated by his new discovery. The author is almost too conscientiously comprehensive; he omits nothing and no one; for example, his careful analyses of the plots of all the plays, extant and lost, of all the tragedians, rob the novice of the thrill of exploration and offer him instead a possibly depressing and certainly bewildering catalogue.

Mr Rose is more concerned with informing us of what the Greek writers were and what they wrote, than of how they wrote. Perhaps this is proper in what is avowedly a handbook, but the glimpses of literary criticism given by the writer (*e.g.* his remarks

on the *Oedipus Coloneus* or on Pindar, Herodotus, and Thucydides) suggest that much more of this would have been desirable even at the expense of many of the detailed lists of facts. For instance, the student who knows nothing of Greek literature would not realize from this book that Aristophanes was nearly as great a lyricist as comedian, or that in Apollonius Rhodius may be found the earliest traces of the psychological love-story, or that the Greek Anthology contains some of the most charming vignettes in literature, or that Plato writes some of the most harmonious and urbane and altogether delightful prose that the world has ever seen.

However, if his work be viewed strictly as a handbook, Mr Rose has done good service in collecting and sifting the latest available materials, and his very numerous footnotes, showing the wealth of learning which we expect from him, form a most valuable bibliographical basis for the study of each and every author and subject. Further he is careful to present all sides of such controversies as the Homeric question or the Origin of Tragedy, and to give a sane and considered judgment on them, even if not always acceptable to the reader. There is a useful and interesting introductory chapter on the Greek peoples and their dialects, and a good bibliography and index. The book is of great utility from its very scope ; but it is primarily a reference-book rather than a literary history, a *catalogue raisonné* rather than the living story of a beautiful language.

R. G. A.

GESELLSCHAFTSFORMEN IM ALTBABYLONISCHEN RECHT. *By* Dr Wilhelm Eilers. *Leipzig : Verlag von Theodor Weicher.* 5 *marks.*

The late Dr Johns wrote a volume ' Bayblonian and Assyrian Laws and Contracts ' in which was a chapter on ' Partnership '. That was in 1904. Since then Assyriologists, especially in Germany, have studied the question more nearly. This valuable study by Dr Eilers is the most scholarly to date.

It is to be expected that ' business ' law and practice would suffer change during the long history of Babylon and Assyria. Hence the need for a sifting of the material and its arrangement according to time and place. This is what Dr Eilers has done here. His material, none of it new, but some of it recent, dates from the end of the Sumerian dynasty of Ur III to the closing years of the First Babylonian dynasty, and comes from old Babylonian cities such as Larsa, Nippur, and Sippar. Part of the new material is from the recently discovered fragments of the Code of Hammurabi. And in this connexion it is interesting to recall that Dr Johns, in the book referred to above, wrote : ' The Code has nothing to say as to partnership unless its regulations on the point were embodied in the lost five columns '. He was right in his guess. The Code has an explicit ruling in the matter of partnership which will be quoted later.

The word for partnership is *tapputum*. Essentially it was a relationship between a creditor and one, but usually two, debtors. The partnership was in respect of money or of land. Dr Eilers keeps the two distinct and seeks the conditions governing each. He points out that the old Babylonian partnership differed from modern partnership in two respects : (1) the contracting parties were in subordination ; (2) the principle : *consensu societas contrahitur*, did not operate : ' Sachingabe ist konstitutives Element der Begründung '. The debtors were, as a rule, commercial travellers. The loan might be recalled at the pleasure of the creditor, or it was a short-term loan for a fixed period. The creditor shared the gain with the debtors, in the proportion of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, according

as there were one, two or three debtors. But the creditor did not share the losses. The ruling of the Code of Hammurabi was that gains and losses should be shared equally by creditor and debtors. This was in accordance with the Code's general attitude towards debtors, lest, as the Code's preamble says, the strong afflict the weak. But the documents here studied indicate that this particular regulation of the Code did not long, if ever, have reality in law. The winding up of the partnership was effected ceremonially before the sun-god. The creditor might, and sometimes did, demand his share in gold, not in the goods in which the travellers had traded with his money. The debtors had no choice.

In the matter of partnership in land, Dr Eilers shows that the arrangement was that the debtors—the lessees—worked the land. The fruits of their labour were divided between the creditor and the debtor ; half each to creditor and debtor ; one third each if two debtors ; and so on. If it happened that the creditor assumed the position of a debtor, then he shared the work in the field and took an equal share in the produce.

This is a very important, though not a final study of this aspect of old Babylonian partnership law and practice. The key words and clauses are not new, but Dr Eilers' interpretation of some of them is. He would not claim more than probability for it. But the main results of his study seem certain. We may remark that if one thinks back from the period to which these business transactions belong, to the Sumerian period from which we have great quantities of business documents, the impression given is that not only the ' law ' but also the terminology of the business is Semitic even though Sumerian ideographs are often used. These later documents seem to belong to a period in which business technique was more developed in a world of expanding trade.

T. Fish.

HISTORY OF ANTHROPOLOGY. *By* Alfred C. Haddon. *Watts & Co.*, 1934. (*The Thinker's Library*, no. 42). 1*s*.

This is the second edition of a book first published in 1910, but it is ' virtually a new book '. It is divided into three sections—Human Biology (pp. 1–78, more than half the book), Cultural Anthropology or Ethnology (pp. 79–125), Comparative Sociology (pp. 126–39), a Retrospect (pp. 140–4) and a ' selected index of authors ' (pp. 145–6). The history of archaeological discovery (with which alone we should be concerned here) occupies 17 pages (chapter 7). It is we believe the only existing attempt of its kind in existence. The present account suffers slightly, in our opinion, from condensation ; for instance, the contribution of Pitt Rivers to the technique of excavation, barely referred to on p. 127 of the first edition, is omitted entirely from the second. The general appearance of the first edition is also far more attractive ; the print and illustrations are better, and it reads more easily. Nevertheless the second edition is otherwise both fuller and more up-to-date than the first. The invidious task of selection has been objectively carried out ; and the new portraits (Keith, Rivers and Elliot Smith) are well chosen. We found the older book stimulating and readable both when it first appeared and at frequent intervals ever since ; and the fact that Antiquity and its Editor have the honour of inclusion in the second deserves to be mentioned in this review.

The amount of knowledge and fact contained on these 144 pages is astonishing, and a tribute to the breadth of outlook of its veteran author, himself a living part of anthropological history. Considering its price we hope that every one of our readers will buy at least two copies.

O.G.S.C.

ANTIQUITY

KENTISH ARCHITECTURE AS INFLUENCED BY GEOLOGY. *By* JOHN ARCHIBALD. *Ramsgate : Monastery Press*, 1934. *pp.* 54, 75 *illus. and map.* 2*s* 6*d.*

Mr John Archibald, who is already well-known as the joint author of the East Kent Regional Town Planning scheme, has here written an elementary handbook dealing with the materials with which early Kentish builders had to work. It is an excellent little book, well illustrated by carefully chosen pictures, and it has nothing to lose by the straightforward style in which it is written. A book of this kind is necessarily selective. Frequently it becomes difficult to know what to leave out, but Mr Archibald makes a very fair choice for his readers, and ranging from the more familiar pre-Conquest buildings to the Flemish Renaissance houses that are such a pleasant feature of East Kent, he discusses the qualities of the various materials used in their construction and the devices by which the builders obtained their peculiar effects.

In a future edition, such matters as ' Rhinish products ', ' Roman Britains ', and ' Clarenden Press ' should be corrected ; and the particulars of the books listed for future reference are not always accurate. R. F. JESSUP.

PAINTING IN THE FAR EAST : an introduction to the history of pictorial art in Asia, especially China and Japan. *By* LAURENCE BINYON. Fourth edition, revised throughout. *Edward Arnold*, 1934. *pp.* XVI, 302, *and* 42 *plates.* 35*s.*

When the first edition of this famous book appeared in 1908 it opened out new vistas to Western students. To quote the author's words in his original preface, it was ' an attempt to survey and to interpret the aims of Oriental painting, and to appreciate it from the standpoint of a European in relation to the rest of the world's art '. His chief concern was not with questions of authorship or archaeology, but with aesthetic values. China, being the parent of Far Eastern culture, bulked as largely then as in this latest edition. Prior to 1908 not much had been written to foster an understanding of Chinese painting, and the little there was dealt chiefly with details of the artists' lives and archaeological notes. A pioneer work was William Anderson's *Descriptive and Historical Catalogue of a Collection of Japanese and Chinese Paintings in the British Museum*, which appeared in 1886. Thirteen years before that the author had accepted an appointment in Tokyo as Professor of Anatomy and Surgery at the Imperial Naval Medical College. In 1882, soon after his return to England, he sold to the British Museum the paintings which he had collected in Japan. The great majority were Japanese, but some 114 Chinese pictures were included, and the collection formed the nucleus of Far Eastern paintings in the British Museum. Anderson's catalogue laid the foundations for the serious study of the subject. It was an achievement which commands respect, although shortcomings are apparent in the light of present-day knowledge. About the same time M. Paléologue, a French diplomat in Peking, wrote a general survey of Chinese art ; and to this S. W. Bushell, for thirty years Physician to the British Legation in Peking, paid fitting acknowledgment when he followed with his well-known handbook, first published in 1904 by the Victoria and Albert Museum. In 1905 there appeared historical treatises on Chinese painting by the late H. A. Giles and Friedrich Hirth, the latter having previously made lesser contributions to the subject.

These provided the historical data which before 1908 were available in European writings. Since then knowledge in the West has grown rapidly. Formerly our

acquaintance with the artists' work was almost limited to reproductions published in Japan; now there are a few notable examples in our public and private collections to which we may turn for first-hand experience. Probably Mr Binyon himself, chiefly through the agency of this book, has exerted a major share of the stimulus to increased and discriminate acquisition. The Central Asian discoveries of Grünwedel, Le Coq and Stein have enlarged our horizon; and in the cave-shrines of Tun-huang the enterprise of Stein and Pelliot has immensely added to the fund of early Buddhist art. The great mass of material brought back by Sir Aurel Stein to enrich the British Museum and the museum in New Delhi has been made known widely through admirable publications. A photographic record of the wall-paintings in the Tun-huang caves is available in the six portfolios of plates which were issued from 1914 to 1924 as part of the series *Mission Pelliot en Asie centrale*. Unfortunately some of these plates are not very clear; the text has not yet appeared—a matter of keen regret to students, since inscriptions accompanying the paintings provided invaluable clues to iconography and dating. According to rumour, many of the walls have been defaced while White Russian refugees lived in the caves after the War. A complete set of large photographs and some coloured drawings were done at Tun-huang by a Russian expedition some twenty years ago. Not long before his death last year, Dr S. d'Oldenburg consulted me about the feasibility of publishing these, and so presumably they are still in existence. So far as it may be seen from the plates already published, the style of the works in certain caves belongs to the end of the fifth century and to the sixth, and here are the sole examples of Chinese painting known to have survived from this early period. Also recently brought to light, mostly in Ho-nan, are actual paintings dating from the Han period (B.C. 206–220 A.D.). They occur on lacquered objects, bronzes, pottery vases, and large bricks used for the walls of tomb chambers. They show a spontaneity and a vital expressiveness of brush-work which are lacking from those wall-paintings interpreted in stone bas-reliefs which formerly provided our earliest criteria. Recently, too, some of the masterpieces from the Imperial Collection in Peking have been made accessible. The foregoing takes note of only some of the events which have modified the outlook since Mr Binyon's first edition appeared in 1908; there should be added the fact that critical appreciation has been advanced by a number of writers, among whom may be mentioned Fenollosa, Kümmel, Petrucci, Sirén, Taki and Waley.

Such were the factors which awoke our consciousness that Chinese artists dominated painting in the Far East, and that theirs was a great art fit to rank with ours in the West. Revised editions of Mr Binyon's book in 1913 and 1923 kept pace with the times, and now in the latest, with his usual insight and charm of language, he brings up to date his survey of Chinese, Japanese, Persian and Indian painting. Certain estimates are modified: for instance, the picture in the British Museum, formerly attributed to Ku K'ai-chih of the fourth century, is accepted as probably a copy done some 200 years later. Another painting, also at one time believed to have come from this artist's own hand, is the *Nymph of the Lo River* in the Freer Gallery at Washington. In 1930 a painting of the same subject was bought by the British Museum for £3500 with the aid of the National Art Collections Fund. Mr Binyon considers it to be a Sung copy, completed by a Ming artist; but I am one of those who assign it to a much later date.

In this fourth edition about a dozen of the illustrations are changed. There are numerous misprints in the text, and the index has more than a hundred wrong numbers of pages, thus detracting from the value of the book for purposes of reference.

W. Perceval Yetts.

ANTIQUITY

THE BUCHEUM. *By* Sir Robert Mond *and* Oliver H. Myers, with the Hieroglyphic Inscriptions edited by H. W. Fairman. (Forty-first Memoir of the Egypt Exploration Society). *In two volumes—text and* 173 *plates.*

The Mausolea of the sacred Buchis bulls and their mothers of the Ptolemaic and early Roman periods at Armant were discovered by Mr W. B. Emery working on behalf of Sir Robert Mond early in 1926. It has taken five seasons to clear the site completely. In 1926–7 Mr Emery was in charge ; in 1928–9 Dr H. Frankfort continued the work ; while from 1929 to 1932 the excavations were carried to their conclusion by Mr O. H. Myers, to whom fell the task of publishing the results, not only of his own work on a particularly ungrateful site, but also those of his predecessors. However well a field-director's records may be kept, it is always a difficult matter for an author to incorporate them with his own, especially when he was not on the site at the time they were made, but Mr Myers has acquitted himself of the task in an admirable manner. An immense amount of work has been put into this report ; every detail of interest has been carefully worked up, and the author has wisely enlisted the services of many experts to deal with technical details. To induce such experts, who are not Egyptologists, to contribute to a memoir of this kind requires not only tact but perseverance. This effort is, we hope, the first of many useful additions to Egyptological libraries.

Sir Robert Mond, to whose keen historical interest and munificence the work is due, contributes an introduction in which he records his appreciation of the excellent way in which the excavations have been carried out. His account of the discovery in 1926 does not quite tally with that of Mr Emery in the *Annals of Archaeology*, xvi.

It is a difficult matter to review such a vast amount of detail. The general arrangement of the book is all that can be desired. The historical summary in chapter 1 is a most valuable résumé of the little that is known of the ancient Egyptian bull-worship, and contains some good suggestions. Perhaps some mention might have been made of the wide-spread reverence paid to cattle among the Hamites, both primitive and modern, of which the Badarian burial referred to is only one example, and which is also illustrated by the cattle-burials of the C-group people recorded by Mr G. W. Murray.

All the various classes of antiquities found are described with great thoroughness, and as much information as possible extracted from what at first sight would have seemed to most excavators very sterile material. A small table showing the frequency of occurrence of each kind of amulet would have been useful. The detailed scrutiny which has been given to some classes of objects has perhaps been unnecessarily meticulous ; for instance, three plates are devoted to the bronze clamps, about which the author himself remarks that ' these objects were too crudely made to show any development '. The plan of the camp house on pl. xi might also have been omitted ; one almost feels that there should have been a little less house, and consequently more work for the same outlay. The sections, plates 172 and 173, are unfortunately divorced from the plans, plates 3 and 4, to which they belong.

Mr Myers' style is vivid, and an occasional humorous touch is not out of place where it helps to enforce a comment. But the footnote on p. 48 is unfortunate ; Mr Bagnani's remark was certainly never meant to be taken seriously, nor intended for quotation in a scientific record.

The translations of the inscriptions and ostraca given by Mr Fairman and Mr Mattha in volume 2 form a very valuable part of the book, especially for those who are not able to read the originals. It is however most regrettable that stela no. 16, which has been in

the British Museum since 1906, and the importance of which was recognized in 1929, should still be so covered with mud that it was not possible to make more than a tentative translation of it for this otherwise complete publication of the Buchis stelae.

GUY BRUNTON.

LO-LANG : the Tomb of the Painted Basket and other two Tombs, being a Report of the Excavations in the season of 1931. Japanese text (*pp.* 150) *by* AKIO KOIDZUMI ; English résumé (*pp.* 28) *by* KÔSAKU HAMADA. 133 *plates* (*many coloured*) *:* 50 *text-illustrations. The Society of the Study of Korean Antiquities, Keijo* (*Seoul*), 1934.

Readers of ANTIQUITY will remember the account of the Japanese excavations at Lo-lang in northwest Korea given by Mr Sakanishi in his review of the publication of Wang Hsü's tomb in that region (Dec. 1931, p. 521). This is another tomb nearby of about the same date, 1 A.D., not quite so rich and naturally not so much of a novelty, but with an interest of its own. In making it advantage was taken of a natural slope so that hardly any tumulus had to be heaped up : this is probably the reason why the chamber filled with water, which preserved certain things particularly well. When tomb-robbers attacked the barrow, it gushed out and drove them away, but the scientific explorers, in a Korean November, were more enduring. The two chambers were mostly of oak elaborately constructed of logs and planks : they have now been set up on view in the Hei-jo (Ping-jang) Museum : all the details of the carpentry are very well shown in the plates. The bodies and trappings in three coffins were on the whole ill-preserved, but the goods in the outer chamber were better. Perfect is a basket adorned with figure-painting on lacquer, almost our first Han painting and recalling in style the Shan-tung sculptures. Other lacquer objects are cylinders for keeping scrolls, boxes, tables, bowls, trays and shoes : also there was an ink-slab in an elaborate box or stand, hairpins and trinkets, and horses in wood corresponding to the clay horses of China proper. The real designation of the tomb is no. 116 at Nan-sei-ri (Nan-ching-li) a village 2 miles south of Lo-lang, but, the name of the dead man being unknown, it has been called the Tomb of the Painted Basket.

Two other tombs, nos. 201 and 260 at Seki-gan-ri (Shih-yen-li) half a mile to the north, had been plundered ; but the former yielded fragmentary lacquers dated 4 and 8 A.D. just like those in other tombs about Lo-lang. Among other things were many of the curious ferrules with side-hooks that have hitherto been explained as arrow-butts, but are now regarded as the ends of the sticks of a great umbrella or canopy. No. 260 yielded an inscribed lacquer and one of the jade sheath-hooks, found as far west as the Volga, that Laufer called *suei*, Professor Yetts (*Burlington Mag.* Oct. 1926, p. 198) *chih*, but the Japanese term *pi*.

The publication is splendid, the work most careful and the English résumé most welcome. We must wish well to the new Society for the study of Korean Antiquities, of which this is the first fruits.

ELLIS H. MINNS.

THE DESERT FAYUM. *By* G. Caton-Thompson, Research Fellow and Associate Newnham Coll., Cambridge, *and* E. W. GARDNER, Research Fellow Lady Margaret Hall, Oxford, Associate Newnham Coll., Cambridge. *Published and sold by The Royal Anthropological Institute of Great Britain and Ireland, 52 Upper Bedford Place, W.C.* 1, 1934. *Vol.* 1, *pp.* XIV, 167 ; *Vol.* 2, *pp.* VIII, 107 *plates and* 7 *maps.* 30*s.*

Although this is the first publication on Egypt for which Miss Caton-Thompson is primarily responsible, she has already established herself as a leader among those who,

in the face of opposition and enormous difficulties, are trying to convert Egyptology into a science. The volumes under review add much to that reputation.

They are thorough and systematic and exhibit that rare phenomenon, an archaeological conscience, which does not permit the worker to scamp any work, however remote from her original enquiry and interest. Thus, although the main purpose of the work was an investigation of the Neolithic period in the Fayum, nearly half the volume is devoted to a detailed description of historic sites, dating from the Old Kingdom to the Roman period, which the authors excavated in the course of their work.

There is no place in a review to catalogue all the important discoveries of the three seasons' work, but the main subjects studied included the geological, geographical and topographical history of Lake Moeris (Birket Qarun), the Neolithic culture of the lake, the nearby gypsum and dolerite quarries and the working and transport of these materials, the typology of Old Kingdom flint implements, the date and construction of the temple of Qasr-es-Sagha, a Ptolemaic irrigation system, and the so-called quay at Dimai.

The authors disprove the possibility of any artificial lowering of the lake level in historic times, such as has been postulated, and show that its history since Neolithic times has been one of intermittent contraction ; the lake was, in fact, ' just below sea level in the earliest dynastic times '. The reclamation work of Ptolemy Philadelphus is shown to have been not the draining of the high level lake, but the construction of those irrigation works discovered by the authors. They prove that the so-called quay at Dimai is ' the free-standing portal of a long processional approach through the town to the temple precincts ', and is mentioned in some Dimai papyri of A.D. 200–300.

The graves of the Neolithic peoples were unfortunately not found, and a diligent search for them resulted only in the clearing of several graves of later date. From the carefully excavated and recorded settlements the authors established the existence of two periods, an earlier culture, ' A-group ', and a later, decadent ' B-group '. Comparisons are made with the Merimde and the Tasian cultures (Lower, and Middle Egyptian Early Predynastic II respectively), but the connexions cannot yet be fully established. The Neolithic Fayumi was a settled agriculturist, who also hunted and fished along the edge of the lake. He had a highly developed flint industry, made stone vases and beads, wove and plaited and was generally highly developed but for his ceramic industry, which was of a low order. The detailed study of this culture, together with the solution of the problems presented by lake Moeris, form the most important part of the volumes.

The studies of the Old Kingdom flint tools and stoneworking are done with commendable thoroughness and attention to technical detail. On p. 11, Miss Caton-Thompson says ' I have suffered too much from the carefully inadequate publications of some of my predecessors and contemporaries, to have any confidence that we, this generation's archaeological workers, can predict the points which our successors will consider valuable or find useful in our work : a detail, now of trifling importance or none at all, may become the pivot of some future, undreamed of, enquiry. I regret, therefore, not the detail in this volume, but the imperfect handling of what there is, and lack of more '. Such is the spirit in which this book is written, a spirit which must permeate excavators more and more, if archaeology is to take its place on an equal footing with the other sciences.

There are a few unexpected omissions. There is no report by a textile expert on the extremely important fragment of Neolithic linen. An oenological opinion on the vine clippings and other viticultural remains would have been of great interest. No attempt has been made to discover the units of length used in the construction of the various

buildings measured and planned, nor are the plans dimensioned. Where inductions are not made, measurements should always be given, since the scale of reproduction in a book renders plans valueless for metrology. Dimensions of bricks, etc., are not given with sufficient precision, since the accuracy of recording is not certainly greater than that of manufacture.

On p. 32, 'microphotographs' is used for 'photomicrographs'. Miss Caton-Thompson has adopted the term 'protodynastic' for the first two dynasties: this is not, perhaps, incorrect, but would it not be better to reserve it for the truly proto-dynasties, *e.g.* '0', '−1', '−2', etc.? On p. 107, the tool-marks on the stone block in fig. 2 of plate 73 are said to be evidence of 'rotatory tooling', which they cannot be, since they radiate spirally from the base of the concavity. Each of the analyses on p. 109 totals to between 100.3% and 102.6%; some explanation of this phenomenon is called for. In one or two places the omission of commas is a source of confusion to the reader.

The format and production are excellent. It is a great advantage to have the plates in a separate volume, though this is impaired by the method of binding, which does not allow the book to lie open. The plans might, with advantage, have been made to fold clear of the volume. The photographs, though for the main part clear, are variable in quality. The plans are beyond criticism and would alone have justified three seasons' work. The drawings are very good, but why have dotted section lines not been included in the pot drawings?

In many places mention is made of sites, which the authors refrain from describing because they are being studied by the University of Michigan, or could not be explored because they lay in the concession of the Oriental Institute of Chicago. It is greatly to be hoped that these will be as well published as the sites studied in these two volumes, for if so they will be given as full justice as can be given to a site today.

OLIVER H. MYERS.

THE PRESERVATION OF ANTIQUITIES. *By* H. J. PLENDERLEITH. *The Museums Association*, 1934. *pp.* VII, 71, *with* 5 *figures and* 2 *plates.* 2*s* 6*d.*

The importance of this valuable pamphlet is not confined to museum curators; it will be of the greatest service to archaeologists in the field, for often it is the well-intentioned first-aid given to antiquities just excavated that causes the worst damage. In these pages the excavator will learn what not to do as well as what to do. Dr Plenderleith will do a further service if he will be persuaded to publish a brief pamphlet solely for the use of excavators, giving them information on the same lines as in this book, for here the advice given is in fact intended for museum workers. Above all it is important for the excavator to adapt his methods of first-aid according to the climate and soil of the place where he is excavating.

Most interesting is Dr Plenderleith's account of metals. He explains how a patination, if developed in pure conditions, is the best preservative of the metal patinated. Such patinations are acquired slowly and cover the surface uniformly, adding to the weight of the object. All metals (except gold) can be thus preserved by natural processes. But, all too often, impurities, either on the object itself or in the atmosphere or soil, prevent the patination growing evenly. The deadly enemies of such patination are the chlorides which attack iron and bronze above all metals. In iron they appear as small beads of moist corrosion, penetrating the oxidization, and in bronze as small spots of malachite green—the miscalled 'bronze-disease'. If chlorides are still present

under a bronze patination, they will continue to emerge through the protective surface and ultimately will destroy the patination. Here we learn how to eliminate them. Everything ultimately depends on the history of the object, the soil in which it was found and the climate and region.

Silver presents less serious problems, except for the difficulty caused by crystallization. Crystallized silver can be restored to its original condition by slow heating.

We learn much as to the treatment of textiles, marbles, wood and ivory. In later publications it is to be hoped that the author will give us advice on the difficult problem of the preservation of colour from fading, of the treatment of paint on marble and how to prevent it from flaking, and on the method of removing ' root-marks '.

The author wisely refrains from correlating his enquiries with the detection of forgeries. Such research is better unpublished. STANLEY CASSON.

ENGLISH VILLAGES AND HAMLETS. *By* HUMPHREY PAKINGTON. *Batsford*, 1934. *pp.* 128, *with* 131 *plates, and* 27 *pen and ink drawings.* 7*s* 6*d.*

The great difficulty in writing any notice of this book is that it is no sooner opened than one is off on a delightful train of memories of past holidays and sojourns in this or that village, and filled with plans for others in the future. This is a delightful book. The photographs are the work of one with the true landscape painter's eye, and Mr Pakington shares that gift himself; he sees his subjects always as a whole and in their proper setting, and it is evident that his knowledge and affection are very real.

But, when the first pleasure is over and one's errant thoughts have been brought back to the subject, there is a faint, but unmistakable, sense of disappointment. Partly perhaps it is caused by Mr Pakington's style of writing, a mixture of Mr Beverley Nichols and of Mr H. V. Morton; partly by his attitude towards these very villages which, in spite of his affection, he is inclined to look upon as so many pretty trinkets—his only allusions to the *life* of the English village are in terms of Ladies Bountiful and curtseying cottagers. Mr Pakington is an architect, and it is natural that his main interests should be architectural. He classifies his subject in roughly topographical groups according to the geological divisions of the country and the consequent styles of building material, but the scope of the book does not allow these divisions to be more than rough ones, and one cannot help wishing for a more detailed classification on the same lines, showing more of those innumerable and fascinating local idiosyncrasies which give so much charm to rural architecture. But most of all it sets one wishing for an analytical study of the structure and history of English villages; a study which would distinguish between the scattered and the nucleated, between the site occupied in prehistoric or Roman times and that first inhabited in the Anglo-Saxon period or later, the cluster of cottages round the manor house and church from the isolated farmsteads of the north and west. Meanwhile let anyone who is tied to the town acquire this book; he will find himself transported to the country as soon as he has opened it, and to the some 400 villages treated of by the author he may add others from his own knowledge, and indulge in the pleasant occupation of constructing alternatives to Mr Pakington's two lists of the fifteen best and the fifteen next best villages. By the time he closes it, in spite of disappointments, his feeling should be one of gratitude to publisher, author and photographer.

E. G. WITHYCOMBE.

REVIEWS

THE PROGRESS OF MAN: a short survey of his evolution, his customs and his works. *By* A. M. HOCART, late archaeological commissioner, Ceylon. *Methuen*, 1933. *pp.* xvi, 316. *7s 6d.*

The purpose of this book should be sufficiently indicated by its title, while the need of such a survey is becoming more and more urgent for workers in the sciences that deal with mankind. 'Masses of facts' says the author in his preface 'threaten to crush the student, as they are crushing the specialist. We must organize our thoughts to cope with them, or they will annihilate thought'. But in addition the author makes clear how wide a field has to be covered by defining his own standpoint as one of 'that tiny minority that uses savages and antiquity merely to throw light upon ourselves . . . Indeed I have made a point of linking up the past and the world with our own British present'. Clearly, with such a gigantic aim, success is not easy: nor is there any shame in having fallen short: to have made the attempt was worth while. Moreover, in what Mr Hocart has done there is much that will prove of use to students. But the purpose of the book is not fulfilled; and therefore the main question is to examine what it was that prevented at least a measure of fulfilment.

In the opening chapters the author deals with the genus *homo sapiens* and uses this biological prelude not only for the statement of familiar scientific methods and their accredited results but also for a much needed exposure of the wild speculations and hasty generalizations that are 'still the fashions among psychologists and anthropologists'. Thus for example he says 'It has been rashly concluded that the child repeats *exactly* the mental evolution of the race, that primitive man, and the savage, as his supposed modern representative, has the mind of a child. This doctrine has actually been embodied in the Treaty of Versailles'. When he approached the main body of his work, the author rightly emphasizes the importance of field-work and, in connexion with the technique of Rivers, reaches the conclusion that 'no field-worker can fail to realize that the culture he is studying is one indissoluble whole, that caste, ritual (under which Hocart comprises magic and religion), trade, manufacture, agriculture, are all interwoven and cannot be separated'.

Mr Hocart, having proceeded thus far sure-footedly, abruptly abandons the standpoint he has built up, and for the remainder of the book relapses into the separated treatment of human culture against which he has ably argued. In a score of chapters under headings that are only too familiar in recent years (*e.g.* Quest of life, Quest of food, Sacraments, Power, Disposal of the dead, the Soul) he shuts up the activity of mankind into more or less unrelated compartments. The result is as might have been expected from the method pursued: a useful enough summary is given of various modern researches, but the drawing together of them is not achieved. There is even a confusion of specific differences.

Yet more than once, and especially in the early chapters, the author comes very near to hitting upon methods that would have enabled him to fulfil the stated purpose of the book. When he reached the standpoint quoted above of a given culture as 'one indissoluble whole', he might have gone on to examine what in a culture is the relation between agriculture and industry on the one hand and social structure and kinship on the other, in what way each and all of these are related to caste and ritual, whether any of them appear to be basic and any derivative, and what is the reaction again of the derivative upon the basic. If in any one such 'indissoluble whole' the author had pierced below surface appearances, with their normal separateness, and had found inner connexions, not only of simple cause and effect, but of consequence in turn becoming cause, then a great advance would have been made.

Then the further question would arise of how a culture (' one indissoluble whole ') changes and develops into another culture. This is the process of history, to which the author pays little attention once he has plunged into the separate technological histories of chemistry, of the use of fire, etc., and then into his studies of the soul and the sacraments and so forth. Already in his *New Light on the Most Ancient East* (unfortunately published* too late for Mr Hocart to use) V. Gordon Childe has given the picture of three related and contemporary city cultures of Egypt, Sumer and Mohenjo-daro, developing from agricultural communities, which in turn he considers had developed from still more primitive cultures. Here, over one and the same large area, are remarkable successive changes in the life of mankind—Childe speaks of them as ' two great revolutions '. To discover the why and wherefore of such changes of culture as these, to combine for this purpose the results of field-work in archaeology with the aid of other disciplines, from climatology and botany to the social sciences, is a necessary part of any attempt to survey the evolution of man, his customs and his works.

Then more involved questions would arise of changes within what to some appear on the surface to be single cultures. Take what is perhaps the best known, though not necessarily the best, example. To the Greeks it appeared that their culture was a continuous whole. Alexander the Great, crossing into Asia, made libation to Poseidon in the mid-Hellespont ; on the plain of Troy he crowned the tomb of his ancestor Achilles ; and to the Greeks this was as it should be. We know that the Greek culture, appearing to themselves the same in essentials, was yet not the same, and that a gulf of great change lies between Homeric times and the Attica of Solon or the slave civilization of the time of Aristotle. What basic changes had taken place in that culture ? ' Diffusion from Egypt ' provides no answer here. Only a painstaking scientific study of documents and remains that have so long been the playground of scholasticism, only their study on the basis of the ' indissoluble whole ' will bring us towards the answer.

These questions have not been asked by the author of this book. Yet in his opening chapters he gave himself the opportunity at more than one point of a line of advance in his investigation which might have led him to these questions. Thus he says ' The big brain of Palaeolithic man is a safe indication of high intelligence . . . It is quite possible that all progress in culture since the Late Palaeolithic has been due, not to better brains, but to greater specialization, a score of brains dividing between them the work that used to be done by one, in other words, to better social organization '. Again, when he begins to discuss man as a tool-making animal, he might have followed out the remark of Charles Darwin upon the ' extremely unimportant ' physical changes undergone by European settlers in America that ' they are completely negligible in comparison with the innumerable changes experienced by the artificial organs of the Americans '. For surely the making and use of tools has had a decisive influence on the development of mankind. By means of tools, chiefly, man carries on a metabolic process with nature. He changes nature outside himself and in so doing changes his own nature. The relation between men engaged in this process, the degree of specialization in any human society, is also bound up with the tools used in this process.

Other aspects of culture follow and are interwoven with the process of material production. But unless the fundamental and continuing significance of man conceived as a tool-making animal is grasped, there is no possibility of a satisfactory survey of human cultures.

R. Page Arnot.

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* Kegan Paul, March 1934.

ANCIENT MONUMENTS OF GREAT BRITAIN

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